

# AMERICAN Railroad Journal

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## Railroad Notes.

### FINANCIAL.

THE annual meeting of the Ontario and Western shareholders, was held in New York on the sixteenth of January. President Winslow's report stated that the unfunded debt of the company had been reduced from \$2,311,898.85 to \$1,221,106.48; also that one-half (23,000 shares) of the capital stock of the West Shore and Ontario and Terminal Company was owned by the Ontario and Western Company, which was, jointly with the West Shore, lessee of all the terminal property at Weehawken and in New York. The regular ticket was elected after a stormy time. Treasurer Jordan made application for a receiver for the company, in the United States Circuit Court, on the same day of the meeting. His complaint recites that the defendant possesses a capital stock of sixty million dollars, of which two million is preferred stock and fifty-eight million is common stock. Included in its indebtedness were unpaid vouchers in the hands of the treasurer amounting to \$171,703.95; unpaid vouchers in the hands of the auditor, \$102,885.58, making a total of \$274,589.53; December pay rolls in the hands of the auditor, \$101,766.76, less \$10,200 advanced by the treasurer, making a total of \$91,566.76; notes outstanding as per schedule, \$516,371.63; loans outstanding as per schedule, \$412,749.38, making the entire amount of recorded indebtedness \$1,295,277.30. To this sum must be added debts incurred for indorsements, the amount of which is unknown. Beyond the current receipts derived from operating its road, it is alleged the defendant corporation has no money in its treasury, and "no resources whatever to meet its obligations and pay its present or maturing debts; that its credit is entirely gone, and that said defendant has become, and now is wholly insolvent."

THE Brooklyn Elevated Railway Committee held a meeting in New York, January 24, to receive subscriptions to the fund of \$400,000 necessary to be raised to put the enterprise on its feet. Mr. Frederick Uhlman presided, and reported that no subscription would be binding unless the \$400,000 was subscribed before February 20, and that no money would be expended unless, before April 1, 1884, a contract shall be signed insuring the construction and equipment of the railway from Fulton ferry or the

bridge to East New York. The committee reported that on the receipt of the \$400,000 such a contract could be had, the iron firm taking it agreeing to construct and equip the road at a cost of not over \$1,500,000, and to take its pay in the securities of the road at a price which has not yet been determined upon. At the opening of the meeting subscriptions amounted to \$134,500, and at the close to \$170,000, with an additional one promised of \$25,000.

THE Missouri Pacific, Jay Gould, president, has issued the following statement of its business for 1883 to its stockholders in advance of the regular annual report, which will not be due for some time. The December business is partly estimated, but the actual results will vary but slightly from the following: Gross earnings of the Missouri Pacific and Iron Mountain railways for the year, \$17,107,441; operating expenses, 53.8 per cent. Gross earnings, including \$607,648 for betterments and for construction, \$9,205,100. Net earnings, \$7,902,341. Dividends received during the year on investments, etc., \$449,282. Total estimated receipts, \$8,351,624. Deduct interest, rentals and other charges, including taxes, \$4,137,861. Total net profits after payment of all fixed charges, \$4,213,763. Or more than 14 per cent. on \$30,000,000 capital stock, representing 1,895 miles of railroad, or about \$16,000 per mile.

THE annual meeting of the stockholders of the Philadelphia and Reading Railroad Company was held January 14. The report which was adopted showed a surplus of \$2,137,232, thus allowing seven per cent. on the preferred and six per cent. on the common stock, with a balance of \$57,634 applicable to the payment of interest on the deferred bonds. The net profits for both the railroad and coal companies amount to \$15,385,842, out of which all rentals and interest accounts have been met, leaving the surplus as stated above. The report closes with the recommendation of the board of managers for the creation of a collateral trust loan of \$12,000,000, at five per cent., to pay off the floating debt, the income mortgage bonds, and to purchase outright the 50,000 shares of Jersey Central stock. The following gentlemen were elected officers: President, George de B. Keim; treasurer, William A. Church; secretary, Albert Foster.

THE gross earnings of the Norfolk and Western Railroad Company for December were \$232,752; expenses, \$146,764; net earnings, \$85,988; decrease of \$15,195 as

compared with corresponding month last year. The gross earnings for 1883 were \$2,812,776, and the expenses \$1,509,573, leaving the net earnings \$1,303,203, or \$196,039 in excess of the previous year. The gross earnings of the Shenandoah Valley Railroad Company for December were \$63,358, the operating expenses \$54,248, and the net earnings \$9,110, an increase of \$20,315 as compared with December, 1882, there having been a loss in the latter month. The gross earnings for the year 1883 were \$854,415, the operating expenses \$662,157, and the net earnings \$192,257, as compared with a loss of \$8,212 for the year 1882.

THE gross earnings of the Philadelphia and Reading Railroad Company for December were \$2,297,642 and the expenses \$1,412,086, leaving the profit for the month \$885,556, an increase of \$46,947 as compared with the corresponding month of last year. The gross receipts of the coal and iron company for the month were \$1,110,456, and the expenses excluding interest, \$1,216,566, a loss of \$106,110, against a profit of \$5,174 for the corresponding month of last year. This statement includes the following from the operations of the Central Railroad of New Jersey: Gross receipts, \$735,841; working expenses, \$465,546; earnings, \$270,295; rental for December, 1883, \$484,090; loss for the month, \$213,795.

THE official statement of the business of all lines of the Pennsylvania Railroad Company east of Pittsburgh and Erie for December, 1883, as compared with the same month in 1882, shows a decrease in gross earnings of \$316,659, a decrease in expenses of \$315,034, and a decrease in net earnings of \$1,625. The twelve months of 1883, as compared with the same period of 1882, show an increase in gross earnings of \$2,003,418, an increase in expenses of \$1,099,745, and an increase in net earnings of \$903,673. All lines west of Pittsburgh and Erie for the twelve months of 1883 show a surplus over all liabilities of \$803,848, being a decrease as compared with the same period of 1882 of \$1,090,452.

THE stockholders of the Buffalo, New York, and Philadelphia Railroad Company held their annual meeting in Philadelphia, January 14, and elected the following officers: President, G. Clinton Gardner; Directors, G. Clinton Gardner, C. H. Clark, E. A. Rollins, B. K. Jamison, J. W. Jones, Isaac N. Seligman, E. F. Winslow, A. N. Martin, C. H. Alden, Bryce Gray, E. L. Owen, B. C. Rumsey, and P. P. Pratt. The annual report showed that the total earnings for the year ending Sept. 30, had been \$2,703,128, and the expenses \$1,387,189, leaving net earnings of \$1,315,939, being an increase as compared with the previous year of \$11,730.

THE official annual statement of the Chicago, Milwaukee and St. Paul Railway Company for 1883 shows that the gross earnings for that period were \$23,659,823.48. The operating expenses, including taxes and insurance, were \$13,778,037.95, being 58 23-100 per cent. of the gross earnings. The net earnings were \$9,881,785.53, out of which \$5,373,925.50 was paid in interest on bonds, leaving a balance of \$4,507,860.03 applicable to dividends as follows: \$1,157,868.81, seven per cent. on \$16,540,983 of preferred stock, and \$2,163,298.27, seven cent. on \$30,904,261 of common stock. After all payments a balance is reported of \$1,186,692.95.

THE United States Circuit Court, Chicago, has authorized the receiver of the Toledo, Cincinnati and St. Louis Railroad Company to issue receiver's certificates, bearing six per cent. interest, to the amount of \$110,000, to pay the amount due for the construction of that portion of the road between Kokomo and East St. Louis. This perfects the title in the mortgage, the bondholders' certificates remaining, however, the first lien on that portion of the road lying between the two cities named.

THE Chicago, Milwaukee and St. Paul Railroad has applied to have 120 additional of its Wisconsin and Minnesota five per cent. 40-year gold bonds listed at the Stock Exchange. The same company also asks to have listed 860 of its one-thousand-dollar bonds, dated January 1, 1881, and payable January 1, 1921, issued to cover forty-three miles of new road completed since November 15, 1883, at a cost of \$20,000 a mile.

SHOULD all the bills at this writing before Congress, which have for their object the forfeiture of unearned lands by railroad companies, become law, the companies would lose about one hundred million dollars' worth of fertile soil. The chances seem to be against the companies, who will probably dispute the constitutionality of acts declaring their lands forfeited.

THE annual meeting of the stockholders of the Pennsylvania and New York Canal and Railroad Company, which is being controlled by the Lehigh Valley Railroad Company, was held at Philadelphia, January 14. The annual report showed that the total earnings for the year were \$2,316,847, the operating expenses \$1,355,026, and the net receipts \$961,821.

THE Northern Railway Company (California) has applied to the New York Stock Exchange to have outstanding bonds, amounting to \$3,964,000, listed. These bonds represent the road completed from West Oakland to Martinez, Benecia to Suisun, and from Woodland to Tehama, aggregating about 150 miles. The bonds are dated January 1, 1877, and are due January 1, 1907, with interest at six per cent.

ARTICLES of association for the Little Rock and Choctaw Railroad have been filed with the secretary of state of Arkansas. All the capital stock, \$1,000,000, has been subscribed. The stockholders will elect officers and directors, March 1. Commencing at Little Rock, the road will run through Pulaski, Perry, Yell and Scott counties to a point on the Choctaw line in the Indian Nation.

A FINANCIAL statement of the Keokuk and Des Moines Railroad, which is a leased line of the Rock Island Company, for the year ending September 30, 1883, shows as follows: Gross earnings, \$534,466.99; rental, 25 per cent. guaranteed by the Rock Island, \$133,616; interest, \$137,500; deficit paid by the Rock Island Road, \$3,833.25. On September 30, there was a cash balance in the Keokuk and Des Moines treasury of \$4,137.41.

THE gross earnings of the Northern Central Railway Company for December were \$409,151, and the expenses \$389,771, leaving the net earnings \$19,380, being a decrease of \$9,307 as compared with the corresponding month in 1882. The gross earnings for the year were \$6,088,130, and the expenses \$3,831,604, making the net earnings \$2,256,526, being a gain of \$298,672 as compared with the previous year.



AT Trenton on the tenth ult., in the Dinsmore case under trial in the United States Circuit Court, W. A. Church, treasurer of the Reading Railroad, produced a statement of the indebtedness on that date. He said the road proper was ninety-three miles in length, and that its capital was about \$35,000,000, including preferred stock.

THE estimated earnings on the Chesapeake and Ohio Railway, January 1 to 14, were \$113,179.48, an increase of \$7,254.00 over those in the same period last year; no additional mileage. During the same period, the estimated earnings on the Elizabethtown, Lexington and Big Sandy Railroad, were \$20,650.00, a decrease of \$1,471.24 from the earnings the same period in 1883.

THE total earnings of the Denver and Rio Grande Railway for January, to the end of the fourth week, and year to date, were \$474,900, an increase of \$26,400 above corresponding period as reported a year ago. Miles in operation by the company including leased lines, are 1,679; being an increase of 364 miles from this time last year.

JUDGMENTS have been entered in the United States Circuit Court, Oxford, Mississippi, of \$191,000 for Green, Hamilton & Co., of Jackson; one of \$69,000 for the Indianapolis Rolling Mill Company, and one of \$51,000 for Fred Wolff, of New York, co-plaintiffs, against the Memphis, Selma and Brunswick Railroad Company.

THE Philadelphia and Erie Railroad Company reports its earnings, for December, 1883, as follows: Gross earnings, \$257,306; expenses, \$219,402; net earnings, \$37,904; net earnings in December, 1882, \$85,686; decrease, \$47,782; net earnings for the year 1883, \$1,488,019; net earnings for the year 1882, \$1,411,878; increase, \$76,141.

THE Secretary of the Treasury has accepted the offer of the New York Central Railroad Company to pay \$65,000, in compromise of the liabilities incurred by the Hudson River Railroad Company, amounting to about \$80,000, prior to the consolidation of the two companies.

THE New York Stock Exchange Committee on stock lists has reported in favor of the application of the Missouri, Kansas and Texas Railroad to list \$10,000,000 of five per cent. consolidated mortgage bonds, which will retire the \$10,000,000 six per cent. second mortgage bonds.

THE governing committee of the New York Stock Exchange has refused to list \$180,000 of the new issue of the first mortgage sinking fund bonds of the Indianapolis, Decatur and Springfield Railroad. The holders of the said bonds, it is stated, are about to apply to have their old bonds returned.

IT is officially stated that the general manager of the Lake Erie and Western Railroad reports that the net earnings of that road for the first five months of the present fiscal year will show a surplus of \$102,487.36 over all operating expenses and fixed charges.

ENGLISH lines cost, on an average, about four times as much as American; French about three times as much, and German about twice as much. Austrian lines are more expensively built than those of North Germany, and cost nearly as much as French.

A PROPOSITION is under consideration by which the Richmond and Danville Railroad Company will be able to borrow \$2,000,000 from the city of Baltimore, on fifty years' time, but payable at the option of the company.

THE net earnings of the Pittsburgh and Lake Erie road in 1883 were four hundred thousand dollars.

THE Brownell & Wight Car Company, St. Louis, are full of work and report a good outlook.

### CONSTRUCTION.

THE New York, Danbury and Boston Railway will be commenced this winter. Its route as now projected will connect at Bronxville with the Second Avenue Railway, New York, pass under the arched bridge of the New York, New Haven and Hartford Railroad at Port Chester, strike the old grade of the Port Chester and Ridgeway Road, a mile northeast of Port Chester station, follow this with very slight changes to Ridgeway, and thence, by a new survey, to Danbury, where it is proposed to connect with the New England Road to Boston. The total distance as surveyed is a fraction less than sixty-five miles.

THE projectors of the New York and Connecticut Air Line, one of the parallel railroads, have given out the contracts for the building of their road from the New York State line at Greenwich to New Haven. The company, under the general railroad law, has until March 24 to begin construction, by which time it must pay in \$23,970 or forfeit its corporate existence. Railroad men in Connecticut admit that it looks as if a road parallel to the New York, New Haven and Hartford, and running between New York and Boston, was at last to be built. The layout of the road is from Greenwich to New Haven.

THE Macon and Florida Air Line Railroad, will run from Macon, Georgia, due south 200 miles through the finest untouched body of timber in the South and a rich undeveloped agricultural land, to Lake City, Florida, connecting with the extensive narrow gauge system of that State. It will furnish a direct outlet and the shortest route for Northern and Western freight. Macon will thus be made a great fruit center and distributing point for Florida business. The estimated cost of the road is \$8,000 a mile. It will be rapidly pushed forward to completion.

THE directors of the Lake Erie and Western Railroad, are reported to have resolved to build forty-three miles of additional road between Bloomington and Peoria, which will be known as the Lake Erie and Mississippi Railroad. This new road will be built by issuing bonds for the exact cost of the road. This extension, it is said, will make the Iowa Central and the Peoria, Decatur and Evansville Roads feeders of the Lake Erie and Western, and will entitle the last named road to a share in the pooled business at Peoria.

THE Senate of Virginia has lately passed a bill extending the time for the completion of the New York, Philadelphia and Norfolk Railroad. This company, under the bill, is allowed two years longer in which to complete its line of railroad from a point on the Maryland State line to a point near Cherrystone, in Northampton County, Virginia. A condition of this extension is that the company shall complete one-half of said railroad by the expiration of one year from the passage of the act.

SURVEYS have been begun for a new railroad between Schleisingsville, Wisconsin, and Chicago. It is surmised that the branch is intended to give the Wisconsin Central

Road a direct line to Chicago, and railway men say the Northern Pacific will then buy the Wisconsin Central and this branch, thus having direct connection with Chicago.

THE Columbus and Eastern Railroad, extending from Columbus to the coal fields of Muskingum and Perry Counties, was opened for traffic January 21. J. E. Redfield, of Essex, Connecticut, is president of the enterprise, which promises to take a high rank among the Ohio system of coal roads.

THE greatest elevation which will be reached by the Pike's Peak Railway will be 14,146 feet, higher by two thousand feet than any railway in the world. It is to be twenty-seven miles long, narrow-gauge, and the trains will be composed of three carriages, each carrying forty passengers.

SEVEN tunnels, of a total length of seven miles, will be built on the line of the Harrisburg and Western Railway, between Harrisburg and the Youghiogony River. This portion of line will cost about two hundred thousand dollars per mile. It is to be completed in two years.

THE Carolina, Cumberland Gap and Chicago Railroad has been surveyed along its entire proposed route, which extends from Aiken, South Carolina, to London, Kentucky, a distance of more than 400 miles in almost an air line. It is probable that the road will be constructed.

RECEIVER ASHBEL GREEN has full control of the property of the North River Construction Company, including that in both New York and New Jersey. The company owns 200,333 shares of New York, West Shore, and Buffalo Railway stock.

THE number of miles of railway in operation in New Zealand at the end of March, 1883, was 1,370 miles. The revenue derived from the railways during the same period was £953,347, and the expenditures were £522,822.

THE railroad commissioners of Connecticut have approved the layout of the line from New Britain, on the New England road, to New York city, and thence to the New York State line, at Greenwich.

THERE are now ten new lines of railway—national, provincial and private—in course of construction in the Argentine Republic, and there are about 14,500 men engaged on these works.

A SURVEY is in progress of a branch from the Shenandoah Valley Railroad to the West Virginia line. The work will be commenced at Harrisonburg and will be rapidly prosecuted.

THE Elevated Railroad bill, Boston, was passed to a third reading in the House by an overwhelming majority, January 31.

It is expected that trains will be running into Reading over the Schuylkill Valley Railroad by the middle of August.

THE Northwestern Railway Company (English) are building freight cars, the frames of which are of mild steel.

THE Toledo, Cincinnati and St. Louis Railroad is to be converted from a narrow to a standard gauge railway.

THE railway from Sanford to Tampa, Florida, is practically completed, and trains are running over it.

## PERSONAL.

JAMES FREEMAN CLARKE, one of Cleveland's most prominent business men, is dead after a brief illness. Mr. Clarke was seventy-eight years of age. He went to Cleveland from Cooperstown, New York, in 1837. For many years he was engaged in mercantile business, and finally retired from it to give a closer attention to railroad and mining interests, in which he became largely interested. He was elected a director of the Cleveland and Pittsburgh Railroad Company in 1856, and has continued a director of the company from that time until his death. He was formerly president of the Atlantic and Great Western Railway Company, and was vice-president of it at the time of his death. He was also president of the Ohio and Pennsylvania Coal Company, and a director of several bank corporations. Mr. Clarke was one of the wealthiest men in Cleveland, and is said to have been the largest owner of Government bonds in that city.

THE stockholders of the New Orleans and Northeastern Railroad have elected the following board of directors: O. Plock, W. A. Goodman, Alexander McDonald, A. Wessel, John Scott, H. Abraham, E. L. Carriere, Robert Mott, and J. H. Oglesby; and the following officers: John Scott, president and general manager; Alexander McDonald, vice-president; O. T. Ambrose, secretary; F. Hahn, treasurer.

THE following gentlemen constitute the newly-elected board of directors of the Maryland Central Railroad Company: William H. Waters, William Gilmor, John M. Denison, Joseph M. Streett, Foulk Jones, James P. Streett, Thomas Armstrong, Eli Tucker, Caleb J. Moore, Charles W. Hatter, Granville O. Wilson, Caleb S. Taylor, and Henry R. McNally.

ON January 17, the directors of the Northern Pacific Railroad Company elected Robert Harris, one of their own number, and a vice-president of the New York, Lake Erie and Western Railroad, president in place of Henry Villard, whose resignation was accepted at the last meeting. Mr. Harris is a thorough railroad man. His age is about sixty.

S. M. FELTON, JR., lately the general manager of the New York and New England Railroad, has retired from that position, in order to accept an appointment as assistant to President Jewett, of the New York, Lake Erie and Western. Mr. Felton will have his headquarters at Cleveland, and will perform the duties of a vice-president.

MR. J. E. CHILDS has been, at his own request, relieved from his duties as assistant general superintendent of the New York, West Shore and Buffalo Railway, in order that he may give his entire time to his duties as general superintendent of the New York, Ontario and Western Railway.

JAMES MCCLINTOCK CREIGHTON has been appointed general manager of the New York, Lackawanna and Pittsburgh Fast Freight line. He resigned as general freight agent of the Pennsylvania Railroad Company to accept this new position.

MR. CHARLES D. GORHAM has been appointed assistant general superintendent of the New York, West Shore and Buffalo Railway. His office will be at the Weehawken passenger station. The appointment took effect February 1, 1884.



STRICKLAND KNEASS, formerly chief engineer and surveyor of Philadelphia, and for many years assistant to the president of the Pennsylvania Railroad Company, died in Philadelphia on the fourteenth ult.

JUDGE PRATT, Brooklyn, has appointed General Jourdan, acting president of the road; also receiver of the Brooklyn, Flatbush, and Coney Island Railroad, better known as the Brighton Beach line.

SAMUEL BRIGGS, general manager of the Connotton Valley Railroad, has been appointed receiver of the same.

#### MISCELLANEOUS.

W. ENDICOTT, president of the Oregon and Transcontinental Company, has written to President Hatch, of the New York Stock Exchange, as follows: "In view of the numerous invented rumors put into circulation to depress the stocks in which the Oregon and Transcontinental are interested, I deem it my duty to state that the company has not diminished its holdings of the various stocks enumerated in the reports of the investigating committee." Treasurer White says that he knows nothing about the reports, wired from Boston, that an application is to be made to put the company into the hands of a receiver and that the company is about to go into voluntary liquidation. Mr. White also says that negotiations are pending for the leasing by the Northern Pacific Railroad Company of the railroad and steamship lines of the Oregon Railway and Navigation Company. President Endicott states that the Northern Pacific people have no intention of leasing the lines of the Railway and Navigation Company.

THE station indicator invented by Henri E. Bissell, of Hartford, Connecticut, is being tried on the aerial railway of this city. At either end of the car, just above the door, is a neat box, on which is painted the words "Next station." Below this appears the name of the station at which the next stop is to be made by the train. As soon as the train leaves the previous station, the passenger hears a bell ring at either end of the car and sees the annunciator change to read the name of the next. The changes are made simultaneously, and the ringing of the bells and changing of the indicator is accomplished simply by the moving of a lever in the locomotive cab, connected with the air-brake valves. The connections between the cars and the locomotive are rubber tubes of the air-brake.

AT the annual meeting of the stockholders of the Fitchburg Railroad, in Boston, January 29, the old board of directors and the president, E. B. Phillips, were re-elected. It was voted to issue coupon or registered bonds of scaled notes from time to time in addition to the bonds already issued to an amount not exceeding half a million of dollars for the purpose of funding the floating debt and for the payment of money borrowed for any lawful purpose; also that the issue of \$1,000,000 Vermont and Massachusetts railroad bonds, dated May 1, 1883, at five per cent. per annum, instead of six per cent., is approved by the corporation.

ARNOLD LEO, a shareholder in the Union Pacific Railway Company, brought a suit in the United States Circuit Court, New York, against the company and Sidney

Dillon, its president, to restrain the company from employing its assets in excess of its corporate powers by issuing bonds for the purpose of obtaining money with which to extend its lines. The company demurred to the bill of complaint, and the case was argued before Judge Wheeler last October. Judge Wheeler has rendered a decision sustaining the demurrer.

FOLLOWING the retirement of the Vanderbilt railroads from the Hoosac Tunnel line comes the formation of the Hoosac Tunnel Dispatch Fast Freight line, which has been organized to run over the Fitchburg, Troy and Boston, the Delaware and Hudson Canal Road, the New York, Lake Erie and Western, and the Grand Trunk west of Buffalo and all its western connections. W. E. Everest, late assistant manager of the Great Eastern line, has been appointed general manager of the new organization, and he will open its chief office in Buffalo, New York.

It is reported that, a few days ago, William H. Vanderbilt, being asked whether he had gone to the rescue of the West Shore and Buffalo Railroad Company, replied that he had not and that he did not want the property: "I repeat what I said the other day, that the building of that road was merely a blackmailing scheme. If the men who have built it went into it actually believing that there was a necessity for it, and that it would prove a paying investment, then they are bigger fools than I supposed."

THE directors of the Kentucky Central Railroad Company have elected C. P. Huntington, president and Isaac E. Gates treasurer. It is stated that the road will be made a part of the Chesapeake and Ohio system. The main line of the Kentucky Central runs from Covington to Lexington, a distance of 100 miles. Its Richmond branch and Maysville and Lexington division increase the number of miles operated to 184.

THE Joint Executive Committee (passenger department) of the Eastern and Western railroads has extended the present pooling contract from March 1 to May 1, and appointed a meeting to take place in April for the renewal of the contract and the readjustment of percentages in the differential fare pools. In the meantime necessary changes in rates will be by arbitrary arrangement.

SENATOR EDMUNDS has introduced a bill to amend the Pacific Railroad act of July 1, 1862, and the acts of July 2, 1864, and May 7, 1878. It provides for the settlement of the claims growing out of the issue of bonds to aid in the construction of the railroads mentioned in the act, and for the securing to the United States the indebtedness of said company.

THE Baltimore and Ohio Railroad Company has purchased the Buckeye Car Works, situated in the eastern part of Columbus, Ohio, and will take possession about the first of March. The railroad company has long needed works of this kind, having none west of the Ohio River. As soon as it takes possession about 300 men will be employed in the building of cars.

MR. ALBERT FINK has come to the conclusion that it might be well for the National Government to have a permanent railroad commission to study the problems of inter-State commerce and supervise the action of railroads engaged in it.

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NEW YORK, FEBRUARY, 1884.

## Principal Contents of this Number.

RAILROAD NOTES.....	441-445
Financial.....	441-443
Construction.....	443-444
Personal.....	444-445
Miscellaneous.....	445

EDITORIAL:—	446
The Business Situation and Outlook.....	446
The Twelve Hours Bill.....	457

MISCELLANEOUS RAILROAD ARTICLES.....	447-456
Report of the Connecticut Railroad Commissioners.....	447
Vanderbilt vs. Winslow.....	447-448
South Carolina Commissioners' Report.....	448
Railway Matters in Canada.....	449-450
Letter from Mexico.....	450
Our English Letter.....	451
A Retrospect, Chapter II.....	452-453
Coming Exposition at New Orleans.....	453
Railways in Greece.....	453
Lubricating and Lubricants.....	454-455
Mexican Notes.....	455
Hints from Recent British Patents.....	456

TRAMWAYS.....	457-461
The Twelve Hours Bill, 457; Recent British Patents Relating to Tramways, 457, 458; The Rasmussen Cable System, 458; Automatic Spring Motor, 458; History of Traction by Cable, Chapter II, 459; Street Railway Notes, 460; List of Recent Patents for Inventions relating to Street Railways, 461; Sand Box Attachment for Street Cars, 461.	

NEW INVENTIONS.....	462-472
List of Patents for Inventions Relating to Railways, Machinery, etc., 452, 463; Improved Window for the Cab of Locomotives, 463; The Fay Automatic Safety Switch, 464; Electric Motor, 464, 465; A Railway Bridge Indicator, 465; Steam Generator, 465, 466; New Method of Electric Lighting, 467, 468; Device to Keep a Derailed Train on the Track, 468; Ellsworth's Alarm Indicator, 468; Hittenger's Car Fire Extinguisher, 469; Steam Automatic Car Brake, 469, 470; Lathe for Locomotive Builders, 470; The Hengerford Metallic Cross-Tie, 470, 471; The Phillips Station Indicator, 471; Thayer's Car Coupler, 471; Spike Puller, 471, 472; Knecht's Balanced Slide Valve, 472; The Bridewell Motor Engine, 472.	

## THE BUSINESS SITUATION AND OUTLOOK.

THE year opened with a general depression in business, now somewhat relieved by an improved tone; but the feeling in the air is that legislative changes are called for by changed conditions resulting from a variety of causes. Better crops abroad have weakened foreign demand for American grain, which, by the way, is not so plenty as usual in recent years. Moreover, the cheaper culture of wheat in India, Russia, and other countries, farther depresses the export trade of that staple, a fact the consequences of which will prove more adverse to our commercial interests in the future. According to its due proportion, internal trade suffers from the causes mentioned, and while it is true that the total returns from railroad traffic were larger in 1883 than in 1882, the most sanguine can hardly expect that the earnings for this year will be as satisfactory. The reduction in mileage last year was significant of the impression, more or less defined and positive, that railroading has been overdone in this country; and, for our own part, we are prepared to think that a reduction of new mileage during this year, especially in parallel roads, would be to the nation's advantage. What the effect of the almost certain early completion of the Canadian Pacific Railway may be upon our trade, cannot, perhaps, be certainly foretold; but it can hardly be doubted that it will divert immigration from the United States to an appreciable extent, and afford the Dominion agriculturist of the Northwest a cheaper means of communication with the east than by means of our railroads.

Turning to the department of manufactures, the most striking feature of its present condition is overproduction, the result, on the one hand, of the artificial stimulus wrought by protection, and, on the other hand, of a foreign trade exceedingly limited in its dimensions.

The conditions thus briefly outlined are sufficient to account for the general disposition to look to Congress for measures of relief, and for the war of words between newspapers representing, on the one side, the interests of those who imagine that they would suffer by considerable changes in the tariff, and on the other, the nation at large. Not for many years has the strife been keener between these two parties, significant, dislike it whether we will or not, of an uneasy hankering after legislative changes of some kind. Meanwhile statesmen appear to linger shivering on the brink. While seemingly they read correctly the signs of the times, they dare not lead, apprehensive of prejudice to their party interests. Delay in acting, however, the present and prospective condition of internal and foreign trade being regarded, must of necessity be short-lived. Action must be taken, and that before long, and the opportunity now presenting itself to courageous statesmanship will be given to new men unless promptly taken advantage of by present leaders.



**Report of the Connecticut Railroad Commissioners.**

It appears from the Thirty-first Annual Report made by the railroad commissioners of Connecticut that there are twenty-three railroads in that State, not including branches. The total length of these roads, single track, is, approximately, 1,970 miles, of which, approximately, 1,360 miles are in Connecticut. The total amount of stock issued is \$56,953,678.25, being an average of \$41,024.34 per mile; of which \$17,635,430 is the amount of stock held in the State, by 5,601 persons. The total amount of debt on the twenty-three roads is \$31,118,353.19, an average of \$22,414.88 per mile. Total stock and debt, \$88,072,031.44; total permanent investments, \$87,303,858.11, and total assets, \$96,631,733.99. The gross earnings for the year were \$16,234,942.44, an increase of \$881,286.40; operating expenses, \$11,890,389.57, an increase of \$1,551,587.36; net earnings after deducting \$10,552.15, deficit reported by the Shepaug Railroad Company, \$4,344,552.87, or \$670,300.96 less than the preceding year. The total number of passengers carried during the year amounted to 16,352,617, an increase of 945,831, or six per cent. The receipts averaging forty-three cents a passenger. The mileage was 336,254,721, an increase of 13,727,801 miles. The freight carried amounted to 7,219,469 tons, an increase of 572,631 tons, or nearly nine per cent. The receipts averaged 1.95 cents per ton per mile.

The commissioners devote a good deal of space to the New York and New England Railroad, of which the gross receipts for the year are \$3,568,653.47, an increase of eight per cent. over those of the preceding year. "The operating expenses are \$3,111,312.62, thirteen per cent. more than last year, and nearly seven-eighths of the entire gross earnings. The net earnings, \$457,340.85, are \$400,000 below those of the preceding year. The board of directors chosen December 11, 1883, caused a thorough investigation to be made into the affairs of this company, which resulted in finding such an unsatisfactory financial condition that on the first of January, instant, the president of the company, Charles P. Clark, was, on motion of second mortgage bondholders, appointed receiver of the company by the United States Circuit Court for the Second Judicial District, and the road is now being run by him in that capacity."

As regards the condition of the railroads, the commissioners say: "We are glad to be able to report in general terms an improvement of the condition of nearly every road in the State, as evidenced by the continued substitution of steel for iron rails, the filling up of pilings and trestle-work, the replacing of wooden structures by stone or iron, the increased attention paid to the surface and alignment of the track, and the establishment of approved electric signals at various points of danger."

The authors of the report are not satisfied with railroad legislation as it now is. "The theory of our general railroad law is that whenever a considerable number of persons (twenty-five) can be found who are willing to subscribe from ten to twenty per cent. of what it would cost to build a railroad, and pay in ten per cent. of the amount subscribed, that under those circumstances there exists a public convenience and necessity which demands the construction of the road and permits the exercise of the right of eminent domain by the corporators. The interpretation of the law however is such, that if one person can

find twenty-four others who are willing to associate with him, he may himself furnish all the capital, and, subject to the assent of a board of directors chosen by him, exercise the right of eminent domain with only the very limited restriction which the railroad commissioners have authority to impose." Regarding this state of the law, the commissioners say: "It is not too late to question, and we think it would be wise to consider, whether some restriction should not be placed upon the exercise of that right (of eminent domain)."

**Vanderbilt vs. Winslow.**

WILLIAM H. VANDERBILT, in an interview with a New York Times reporter, said: "The New York Central has one bond of \$40,000,000 and another extension of an old issue of \$12,000,000. The two make \$52,000,000, and that is all. The West Shore's first mortgage is \$50,000,000; it put up \$10,000,000 of its income bonds with the North River Construction Company, and then there is the \$12,000,000 terminal mortgage, which is spouted with the Equitable Life Assurance Society for \$6,000,000, which I guess the insurance company wishes it had back. That makes \$72,000,000 out now, doesn't it, to say nothing of anything else." He said further that the object of the building of the West Shore was "to blackmail the New York Central," and that "the West Shore will have to take all the New York Central's business in this State to earn the \$11,000,000 necessary to pay the operating expenses and interest on the bonds."

General Edward F. Winslow, president of the Construction Company, which built and owns the controlling interest in the West Shore, replied to these statements on the following day, in an interview with a representative of the same journal. He is reported to have said: "Mr. Vanderbilt states that the New York Central has one bond of \$40,000,000, and an extension of an old issue of \$12,000,000. In instituting a comparison, he neglects to state that the interest upon more than half of the New York Central's bonds is seven per cent., while on the West Shore securities the interest is but five per cent. He also omits the fact that the New York Central pays nearly \$2,000,000 annual rentals, which is a fixed charge, and which, if capitalized at five per cent. would represent an additional indebtedness of \$40,000,000. He makes no mention of the floating debt of the New York Central Company. Another reckless statement is the one that the Equitable Life Assurance Society has loaned \$6,000,000 upon first mortgage bonds of the Terminal Company. This demands the most emphatic denial. The West Shore and Ontario Terminal Company is a corporation entirely distinct from the two railway companies, but its capital stock is owned by the West Shore and the New York, Ontario and Western separately, but equally. I see Mr. Vanderbilt utters a pretended belief that the West Shore Road was built for the purpose of forcing the New York Central Company to buy it. The complete answer to this is the fact that it has never been offered for sale to him or to any company with which he is connected, or to any other parties, and I hope, for the interests of the mercantile community of New York State, that it never will be." In answer to the last quoted statement made by Mr. Vanderbilt, General Winslow said: "As the fixed charges of the West Shore, with its leases and terminals, will not ex-

ceed \$3,000,000, any one familiar with railways can see the recklessness of such a statement."

### South Carolina Commissioners' Report.

FROM the Fifth Annual Report of the South Carolina Railroad Commissioners, politely sent us by those gentlemen, we clip the following information:

#### NEW AND PROJECTED RAILROADS.

The Georgetown and Lane's Road, running from Georgetown to Lane's, a station on the Northeastern Railroad, thirty-six miles from Georgetown and fifty-five miles from Charlestown, has just been completed and not yet put into operation. It is a valuable addition to the railroad system of the State, bringing into intimate communication with the other portions of the State a section hitherto somewhat inaccessible, and opening another shipping port in the State. Its officers report that "the road is laid with the best steel rails and is first-class in all of its appointments, including cars of 40,000 pounds' capacity."

The Carolina, Cumberland Gap and Chicago Railroad Company encourage the hope that this railroad, so important to the State, will ere long receive the financial support requisite to carry it forward.

The grading of the Spartanburg, Laurens and Greenwood Road is progressing rapidly to completion, and the road will probably be in operation before the next session of the Legislature.

Work on the Greenville and Laurens Road, the commission is informed, will be soon begun and the work pushed rapidly forward.

#### CAPITAL STOCK.

The capital stock of the railroads as far as reported is \$15,646,160.

#### DEBT.

The total debt of the roads which have given this item in their annual reports is: Funded, \$26,583,770.11; unfunded, \$1,053,659.87, making a total of \$27,637,429.98. Average debt per mile, \$13,521.41. The Asheville and Spartanburg, Charleston and Savannah, Cheraw and Chester, Chester and Lenoir, Laurens Railway, and Spartanburg, Union and Columbia Railroads, make no report.

#### INCOME.

The income of the roads for the year ended June 30, 1883, is \$5,832,281.19, as follows:

Earnings passenger department.....	\$1,773,192 97
Earnings freight department.....	3,938,616 89
Income from other sources.....	120,471 33
	<hr/>
	\$5,832,281 19

#### EXPENSES.

The total expenses of the roads for the year ended June 30, 1883, is.....\$4,191,367 16

Showing a net income.....\$1,640,914 03  
An increase over last year of.....445,261 82

#### AMOUNT OF BUSINESS.

The following statement shows the number of passengers and tons of freight transported during the years ending June 30, 1882, and June 30, 1883:

<i>Passengers Carried.</i>			
Number.....	1882.	1883.	
	961,313	1,135,697	
		961,313	
Increase.....		174,384	
<i>Tons of Freight Carried.</i>			
Number.....	1882.	1883.	
	1,323,361	1,501,150	
		1,323,361	
Increase.....		177,789	

#### MILEAGE.

The following statement shows the train, passenger and freight mileage:

Mileage of passenger trains.....	4,381,120
Mileage of freight trains.....	7,554,725
Mileage of other trains earning revenue.....	6,623,143
Asheville and Spartanburg, not given in detail.....	129,396
Total.....	18,688,384

#### TAXES.

The taxes paid by the various roads amount to \$202,226.19, as follows:

In South Carolina.....	\$166,650 55
In North Carolina.....	5,726 79
In Georgia.....	852 49
C., C. & A. R. R., not given in detail.....	28,996 36
Total.....	<hr/>
	\$202,226 19

#### ROLLING STOCK.

The combined rolling stock of all the roads is as follows:

Locomotives.....	198
Passenger cars.....	126

Freight cars.....	2,949
Express and baggage cars.....	58
Other cars.....	120

Of the locomotives 85 are equipped with air brakes, and of the cars 190 are equipped in like manner. This statement shows an increase over last year of 6 locomotives, 473 freight cars and 20 express and baggage cars.

#### STATIONS AND EMPLOYÉS.

There are 380 stations, of which 313 are in this State, and 6,126 employés, including officials.

#### HIGHWAY AND RAILROAD CROSSINGS.

Of 866 highway crossings, 815 are at grade, 20 under and 31 over. Of railroad crossings there are 12 in this State.

#### BRIDGES AND TRESTLES.

There are 59 bridges on the different railroads, of which 4 are iron, 39 wooden and 12 combination. Of these, 4 have been built during the year: 1 iron, 1 wooden and 2 combination.

There are 788 trestles, with a total length of 187,803.2 feet, and replaced by earth during the year 9,076 feet.

#### COMPARATIVE STATEMENT OF TOTAL INCOME.

##### *Expenses and Net Earnings.*

Total income of all the roads for 1883.....	\$5,832,281 19
Total expenses of all the roads for 1883.....	4,191,367 16
Net earnings.....	<hr/>
	\$1,640,914 03
Total income in 1882.....	\$5,885,738 31
Total expenses in 1882.....	4,690,086 10
Net earnings.....	<hr/>
	\$1,195,652 21
Net earnings for 1883.....	\$1,640,914 03
Net earnings for 1882.....	1,195,652 21
Excess of net earnings for 1883.....	<hr/>
	\$445,261 82
Total income for 1883.....	\$5,832,281 19
Total income for 1882.....	5,885,738 31
Excess of total income for 1882.....	<hr/>
	\$53,457 12
Total expenses for 1883.....	\$4,191,367 16
Total expenses for 1882.....	4,690,086 10
Excess of expenses in 1882 over 1883.....	<hr/>
	\$498,718 94

IRON IN NEW SOUTH WALES.—In our advertising columns will be found a remarkable invitation addressed to the iron masters of Europe and America by the government of New South Wales. This prosperous colony is very rich in iron and coal of excellent quality. The government has within a few years constructed over 1,200 miles of railroad, and more than 500 miles are in course of construction, all the materials for which, except the sleepers, have been imported at a heavy charge in the way of freight, etc., from England. These charges should operate as a large "protection," and afford great inducements to enterprising men to embark in the manufacture of iron and steel in the colony. It is stated that 1,250,000 tons of iron and steel, inclusive of permanent way material, have been imported into New South Wales and Victoria within the last ten years. The government has determined to make a bold experiment to naturalize the iron industry in the colony, and has, in the terms of the notice which we publish to-day, called for tenders for 150,000 tons of steel rails (or any portion thereof) to be manufactured in the colony from New South Wales ores. Printed copies of preliminary specifications, conditions of contract and other particulars may be had from Messrs. R. W. Cameron & Co., of New York, by iron masters and others desirous of obtaining authentic information on the subject.

THE railroad companies having their headquarters at Pittsburgh, Pennsylvania, held their annual meetings in that city on the 14th ult.

THE main offices of the Oregon Railway and Navigation Company have been moved to Boston.



### Railway Matters in Canada.

SIR CHARLES TUPPER'S ANNUAL REPORT OF CANADIAN RAILWAYS—THE CANADIAN PACIFIC—THE GOVERNOR GENERAL'S SUGGESTION OF AID TO THE C. P. R. C.—OPPOSITION TO IT—MR. BLAKE'S OPINION—THAT OF THE MONETARY TIMES (TORONTO)—LORD LANSDOWNE'S HOPE—SIR JOHN MACDONALD'S PROPOSAL—MINOR RAILROAD MATTERS.

SIR CHARLES TUPPER'S annual report of Canadian railways and canals, shows that the several lines operated and maintained by the Government during the past fiscal year were, the Intercolonial, Prince Edward Island, and Windsor Branch, a total of 1,071 miles, the expenditures on which were \$2,636,284, and the earnings, \$2,541,204, a net loss of \$95,080. Subject to approval by Parliament and by the Provincial Legislature of Nova Scotia, arrangements have been made under which the Dominion will retain the Pictou Branch and will acquire the Eastern Extension Railway, operating the same as a portion of the Intercolonial Railway. In relation to the Canadian Pacific Railway, the report says that the location of the road for a total distance of 964 miles west from Winnipeg, has been approved of by a series of Orders in Council, the last of which was dated the sixth of December, 1883. The obtaining of a pass other than the Yellow Head through the Rocky Mountains, contemplated in the original location, has long been an object with the company, and they have selected a line via the Kicking Horse Pass. The total length of the line passing through Winnipeg and the Kicking Horse Pass to Port Moody will be 2,888½ miles. There are also about 395 miles of branch railways in operation.

It may be remarked, in addition to these facts given in the report, that by the opening of navigation, the Canada Pacific Railway will have an independent route from the base of the Rocky Mountains to the seaboard. The Ontario and Quebec Railway will be ready for freight traffic before spring fairly opens. The route will then be from Montreal to Perth, by the Canada Pacific's own line; Perth to Toronto by the Ontario and Quebec; Toronto to Owen Sound by the Toronto, Gray and Bruce Railway; Owen Sound to Port Arthur by the company's new iron steamers, and Port Arthur to Calgary by the Canada Pacific Road. In the event of the Northern Railway falling into the hands of the syndicate, it is probable that Collingwood will be the starting point for the Canada Pacific steamers. In the meantime, the company is busily pushing forward the work of constructing a large grain elevator at Owen Sound.

The speech made by the Governor-General, on January 17, at the opening of the second session of the Dominion Parliament, was remarkable, as in other respects, for what was said of the Canadian Pacific. "Although," observed Lord Lansdowne, "the time within which the railway company is bound to finish the road will not expire until 1894, my Government has thought it of the greatest importance for the settlement of the Northwest and the development of our trade that its completion, from sea to sea, should be hastened, and the company enabled to open the line throughout by the spring of 1886. With this view, and in order to aid the company in procuring sufficient capital for the purpose by the disposal of its unsold shares, the Government agreed to receive a deposit of

money and securities sufficient to pay a minimum three per cent. dividend for ten years on \$65,000,000 of the stock. That arrangement was made in the belief that it would give steadiness and increased value to the shares in the market. A combination of unfavorable circumstances has prevented the fulfilment of the expectations, and the company has not been able to obtain the required capital by a sale of its stock. The best means of preventing any delay in the great object of the early completion of the railway demands your earnest consideration. I am pleased to be able to state that the operation of that portion of the railway already opened affords most gratifying evidence of its soundness as a commercial enterprise and of its great value to Canada."

The attitude of the Government towards the road, as stated in the above quotation, is provoking a great deal of discussion in the Canadian papers, with now and then a spicy hit at Lord Lansdowne's expense. Opposition to his proposal of rendering further aid to the company engaged in construction is wide-spread and influential. In the debate on the Governor-General's address, Mr. Blake contended that the Canada Pacific Railway Company had not fulfilled the promises made to the country, and hence that the people of the Northwest were directing their attention to the Hudson's Bay route, and he hoped the Government would aid the construction of that railway so as to relieve the people from the exorbitant charges made for transport over the Pacific Railway. Notwithstanding the boasted progress made in the construction of this railway, he contended that this progress was too rapid for the settlement of the Northwest and for the good of the country at large. He thought the announcement in the address of additional aid having been given to the company in the shape of a Government guarantee on their stock was of an alarming character, especially as this grave responsibility was undertaken by the Government for no better purpose than merely abridging the time for fulfillment of the contract, already too much accelerated; and he charged that the company had gone beyond the legitimate articles of the charter, and endangered their ability to fulfill their contract by investing capital in the purchase of branch railways.

The *Monetary Times*, Toronto, suggests that the road be mortgaged and sufficient money raised in that way, and opposes additional aid which "would ultimately add to the burthens of the people." Moreover, in the opinion of that journal, "rapid progress is not a question of life and death." So far as appearances enlighten as to the future, the probability is that laws will be devised and carried out for the completion of the road by the spring of 1886, thus, in the language of Sir John Macdonald, providing "a through all-rail route," when farmers "would not have to submit to the exactions of American railways." Lord Lansdowne seems to have set his heart upon this consummation. In his speech before the Toronto Club, he said: "I have been cherishing for some time past the hope that I may be the first Governor-General to cross the Rocky Mountains on Canadian metals." A new agreement with Government, proposed by Sir John Macdonald, contains a provision that it lend the Canada Pacific Railway Company, \$22,500,000. On the other hand, the proposed agreement provides that the Government shall have the first lien and charge upon the entire property of the company, real and personal (with an exception specified), as security

for its loan falling due November 7, 1888, and that until the payment in full of the indebtedness of the company all moneys earned by the company as postal subsidy and for transport shall be retained by the Government, to be applied first, on account of the interest becoming due from time to time upon the loan hereby authorized, and then to the payment of interest. The severity of these conditions will probably disarm the opposition to some extent. The size of the elephant fostered by the Dominion Government, is indicated in the fact that up to June 30, 1883, it had spent \$36,098,842 on the Canadian Pacific Railway.

Some minor items of news are that the track on the Napanee, Tamworth and Quebec Railway has been laid eighteen miles from Napanee, or to within ten miles of Tamworth; a railway bridge is projected across the St. Lawrence at Quebec, for the use of the New Brunswick trade; the Canadian Pacific Railway Company's telegraph line is to be extended from Algoma Mills to the Michigan Sault by submarine cable; and President H. B. Ledyard, of the Michigan Central, says that the Canada division will not be double-tracked until there is more business than at present.

#### Letter from Mexico.

ACAMBARA, MEXICO.

THE Mexican National Construction Company are pushing their road forward to its terminus on the Pacific Ocean. A short time back it was extended to Morelia. The inhabitants were much delighted, and received the officers of the company with the firing of cannons, music of bands and great enthusiasm. The north and west divisions to Morelia and Celaya, promise a large increase of traffic, both in freight and passengers, and thus augment the receipts of the road and add to its prosperity financially.

Opportunities for traveling and transportation will soon build up a trade here that will astonish the dons of this, for a long time, almost inaccessible part of the world. The old diligence will soon be one of the things of the past, like the stage coaches of the United States.

This town may become in time a noted watering place. The water flowing from the hot springs is very abundant, and so hot that it steams very considerably, even in the hottest days. It is as clear as crystal and very healthy for bathing. Just what its medicinal qualities are has not yet been ascertained. The town is situated in the valley of the Lerma. This is not much of a river in this land of rivers, but certainly better than many in the old continent; for instance, the Manzanarès, on which Madrid, the capital of Spain stands, which has been the subject of much witticism. A German ambassador asserted that it was the best river he had ever seen, as it was navigable either on horseback or by carriage; and when Napoleon's army entered Madrid, they exclaimed: "What! has the river run away too?" But to get back to Acambara. One of the high hills near the town affords a most magnificent "vista." Sitting on the sharp point of a rock projecting from this hill, it seems as if one could almost toss a stone into the middle of the plaza. Winding away off in the distance is spread the rich valley of the Lerma. The ancient town, just at our feet, seems to be an exquisite piece of mosaic, its Moorish domed churches and

high bell towers patterning themselves from among the green trees. The queer narrow streets and flat-tiled roofed houses, show more like a picture than reality. At the north end of the town is an old grey convent, whose high-barred windows look into a paved court. About a square nearer is the Cathedral in the center of the town, with its high, solid bell tower, cold and gray against the warm, green background of the trees of the little parks, and one can hear the deep tone of the great bell, slowly tolling for some departed soul, and almost imagine that one catches the dull tone of the priest as he performs his solemn duties. The Plaza (market) dotted over with white sunshades and booths, seems alive with animated pigmies. One just hears an unintelligible murmur, but understands that the busy folks below are wrangling for their week's supplies and Sunday dinner, for Sunday is the market day of the week. "How much do you give?" "Here you are, sir; have the goodness to notice how I have heaped the measure." "Don't you give any more than that for a quartillo" (3 cents)? "Can't you put on just one more piece? oh! I am very poor." "Well, have it; may the Lord forgive me for taking the bread out of my children's mouth." And so it goes on.

A quaint old Mexican air floats up from the bull ring as the band advertises a fight in the Plaza de Torres, mingling with the merry voices of the children as they gather around it.

From the foot of the hill springs away with bold curve past the town, the muddy river, performing various contortions before it disappears on the opposite side of the plains. The principal street, after winding past church and Plaza, passes majestically over the river on a grand old stone bridge, which joins the shores with twenty solid stone arches, rising high in the middle and sloping to either side. This solid piece of masonry for over two hundred years has looked down upon the tree tops and muddy waters beneath, on the merry copper-colored youngsters, as they romped and splashed in the water, while their mothers washed the only apparel that blessed their little backs. Nothing changes in this land; as they do now, so did their ancestors for generations before.

The line of the Mexican National Railway, sweeps between the town and river, and then spreads its arms north and west. That little column of smoke rising in the south is the City of Mexico express train descending into the valley of Tepetougo, fifty miles to the south. That white stream just over the ridge to the west, is Largo (Lake) Quitzro, whose salty waters spread for forty miles along the foot of the mountains, while high, conical peaks springing up in the very center, cast long, dark shadows across its briny waves. The bald-headed eagle floats slowly by. The Indian boy with his dogs and goats comes creeping up the hill side, to pastures ever green. I lie entranced, breathing forth reminiscences of home and friends in fragrant clouds of smoke, slowly and lazily drinking in the lovely scenes below me, oft wondering if I shall ever find enough of the bright dust to take me back to the life I left.

J. O.

AN exhibition of arts, manufactures, and scientific, agricultural, and industrial products will be opened at the Crystal Palace, Sydenham, near London, on the third of April next, and will continue open six months. Americans are invited to exhibit.



## Our English Letter.

WRITTEN SPECIALLY FOR THE AMERICAN RAILROAD JOURNAL.

YOUR contemporary, *Herapath's Railway Journal*, talks very plainly about a class of business men, with whom you, Mr. Editor, have a great deal to do; and I quote the passage to give you an opportunity of reply, if you feel like it. "It is an unhappy characteristic of American railroad men," remarks the above-named venerable paper, "that they never know quite exactly when to stop, and that they are either proceeding with the work of construction at a headlong rate, or are suffering from a panic brought about through their own folly." Of course you are more concerned with the charge itself than with the manner in which it is expressed; and from what I have observed of the AMERICAN RAILROAD JOURNAL for a long time, you are too sturdy an "institution" to split hairs about questions of mere phraseology, especially when, as in this case, irregularities in railroad operations on your side of the "herring pond" have a marked influence on the money market here. How could it be otherwise than that Herapath should complain, when the depreciation of American railroad securities in 1883, amounted to \$230,000,000?

John Bull, moreover, finds an additional occasion of grumbling in the large number of "bubble companies" originated within his own little domain. The figures I am about to give will startle your readers, especially should they be under the delusion that the august gentleman I have named, does business, generally speaking, on a sure basis. Nearly twenty thousand companies were registered from 1862 and 1882 (inclusive), of which only 8,838 were alive at the end of the second of these years; which is the same as saying that fifty-five per cent. had burst during the brief space of twenty years. Whether or not legislation should aim at the prevention of commercial bubble-blowing is a matter which our statesmen may be called upon to consider. There is something to be said on both sides. If it is claimed to be proper and reasonable to protect the public against adventurers who get up ephemeral companies, it is unquestionably true that people should be exceedingly careful as to how they invest their money; and perhaps the teachings of experience, in this particular matter, may be more salutary in the community than the meddling of legislation. I give it up.

If you have not already noted the publication in *Temple Bar*, of an article on "Our Fastest Trains," you will be obliged to me for directing attention to some of its very interesting statements of facts. The writer says that nearly half a century ago Mr. Brunel held that the speed of one hundred miles an hour was possible under favorable circumstances, on the broad gauge, and was all but attained between London and Bath. "In 1846, on the South Devon Railway, then worked on the atmospheric principle, a speed of upwards of seventy miles an hour was obtained on an experimental trip from Exeter to Starcross, without the use of a locomotive." The following has a disagreeable interest to Americans, but I will nevertheless venture to quote it: "When peace or war were in the balance, a special engine was kept for a whole week at Holyhead waiting to bring up the United States dispatches on the Trent seizure. On their arrival at Holyhead they were immediately forwarded to Euston by

a special train over the London and Northwestern Railway, which covered the 264 miles intervening in five hours without any delay or stoppage on the road, other than a few minutes in pausing to change engines at Stafford." The well-informed author has his opinions. He says: "The superiority of the broad to the narrow-gauge (and of the longitudinal to the cross sleeper) for speed, safety, and comfort is beyond dispute." Continuing his observations on the Great Western, the only broad-gauge line in England, the writer says: "It forms a compact organism of 2,300 miles (the largest in the kingdom) with first rate carriages and permanent way. It has the smoothest running track in the kingdom, and the speed between Paddington and Swindon is the highest of any long run in England. The fastest trains on the Great Western are naturally the broad-gauge ones (to the West of England); and those leaving Paddington at 11.45 A. M. and 3.00 P. M., with the two corresponding up-trains, are the quickest in the world, allowance being made for time stopped at stations on the road. At some of the stations they pass on the road these trains are literally timed to the second in the running time books, the quarter-minutes being given." These quotations from an article full of interest, must be of service in every country where increased speed in railway traveling is a consideration of importance.

Speaking of high speed reminds me that Mr. F. Hahn Dauchell, a civil engineer of London, proposes to run his electrical motor at from one hundred and fifty to two hundred miles an hour, but not to take passengers, limiting transit on his railway to letters and parcels. His system has been given a trial, which proved satisfactory. It provides two rails, one above and one below the train, the former to convey the electric current and prevent the train running off the rail, and the latter for the train to run upon, at the almost incredible speed named. The wheels of the motor are of great diameter. They are grooved, and run in line with each other.

This wonderful London of ours has unmatched provision for local travel. Omnibuses, cabs, the underground railway, and other facilities, increasing, as you free-speaking Americans say, "all the time," make "getting around" in the metropolis, cheap and easy. The vast traffic to and from this largest, noisiest, and busiest of cities is provided for by fourteen strictly terminal railway stations—you would call them depôts—from which 2,202 trains depart during every twenty-four hours.

There may be something of practical utility in my closing this letter with a few figures anent a temporary bridge, consisting of four steel arches, which has been thrown across the River Spey at its widest part between Fochabers and Gartmouth to accommodate the workmen engaged in building the Moray coast line for the Great North of Scotland Railway. The span is five hundred feet wide, and the four cables serve as guides to a lattice iron carriage weighing one hundred and forty pounds. The four upper wheels of the carriage have each a crank attached, to enable the passengers to propel the car up a short incline of forty feet at the end of each journey. The remaining 460 feet are traversed by the impetus given the car by gravitation. Mr. Harper, of Leafeld, is the designer of the bridge.

H. A. L.

THE Old Colony Railroad is seeking leave from the Massachusetts legislature to double-track its road.

## A RETROSPECT:

BEING

### A Complete History of Railroad Progress in America.

*Compiled from this Journal, beginning Fifty-two years ago.*

#### CHAPTER II.

CONTAINING AN ACCOUNT OF THE ORIGIN AND BEGINNING OF THE BALTIMORE AND OHIO RAILROAD.

NO. 2, Vol. I, of the AMERICAN RAILROAD JOURNAL is dignified with a new pictorial heading, being a sketch of the steam carriage employed on the Hetton Railway, with tender and two wagons attached to it. The tender is an odd-looking object, with its old-fashioned water-barrel. This quaint old cut did duty in the capital position of the AMERICAN RAILROAD JOURNAL, from January 7, 1832, to the last issue of that year, after which it was superseded by an illustration, showing, among other things to be mentioned in due course, that the water-barrel had given place to a tender forming part of the locomotive itself.

The "History and Progress of Railroads" contains here and there a remark most quaint in the light of subsequent developments. How deliciously patronizing, for example, it appears to say of Robert Stephenson, that his "inquiries into railroad conveyance have been pretty extensive!" But fifty-two years ago Stephenson's best work was not yet done. With the exception of here and there a quotable phrase like this, the series of papers constituting the "History and Progress" is nowise remarkable, beyond its faithfulness as to facts, and modern readers are pretty well acquainted with these.

In the beginning of January, 1832, the Baltimore and Ohio Railroad was already "in the fourth year of its progress, and in spite of great difficulties and greater doubts at its outset," presented "the longest continuous line of railroad in the world." Our editor remarks of it, with what the typos call a double screamer (!!) as follows: "It would seem, from experiments already made on this road, that there is no reason to doubt that the travel on it may be safely carried on at the rate of from twelve to fifteen miles an hour, by the aid of steam power, and that passengers may be conveyed from Baltimore to the Ohio River within from twenty-four to thirty hours, at all seasons of the year—a distance little short, we believe, of 350 miles!!" Moreover, one "remarkable circumstance" "of most encouraging augury" was, "that on the whole line only two summits occur, where the employment of stationary engines will be necessary. On the rest of it, locomotive engines will be able to travel efficiently."

The fifth report of the Baltimore and Ohio bears date December 20, 1831, and has the signature "Philip E. Thomas," president of the company. Hereafter are valuable extracts from this valuable document, accompanied with such remarks as may be suggested by its perusal:

"The railroad has been opened for travel as far as to

Frederick, a distance of sixty-one miles from the depot of the company at the head of the basin in the city of Baltimore; a single line of tracks has also been so nearly completed to the 'Point of Rocks,' on the Potomac River, as to afford a full assurance that the communication between the tide waters of the Chesapeake bay and that river, will very soon be opened through this channel." Such gratifying results had grown out of a state of feeling based upon superior political sagacity. In President Thomas's own words: "The establishment of an efficient, speedy and economical means of inter-communication between the different sections of our country, had been for a long time deemed of such importance, as to involve, not only the well being, but perhaps the very existence of our social compact." Actuated by this conviction, the citizens of Baltimore aspired to take their part in further compacting the Federal union, and besides to augment the commercial importance of their city, by securing a more direct and easy means of communicating with the valleys of the Ohio and Upper Mississippi. Their original idea was to do this by means of a canal between the Ohio River and Chesapeake Bay. When in the course of time, the United States engineers intrusted to make the proper researches, had reported on this project, Baltimoreans "saw, with dismay, that a canal encumbered with six hundred locks, a considerable portion of which would be elevated from twelve hundred to more than two thousand feet above the tide, and which would be sealed up with frost three or four months in the year, with only a limited and precarious supply of water in summer, must be wholly inadequate to the demands of the immense trade it was destined to accommodate." But the bad outlook in the one direction led these wide-awake folks to seek for a more promising enterprise than that presented by it. Accordingly a meeting of citizens of Baltimore was held, February 12, 1827, at which the capabilities of railroads as means of inter-communication superior to canals and turnpike roads were considered, as shown by various documents and statements; and a committee was appointed to further consider said documents. This committee did its work with commendable industry. It "subsequently reported a mass of facts, derived principally from English authorities," and in its judgment, warranting the recommendation: "That measures be taken to construct a double railroad between the city of Baltimore and some suitable point on the Ohio River, by the most eligible and direct route, and that a charter to incorporate a company to execute this work be obtained as early as possible."

No time was lost in acting upon this comprehensive recommendation. "The legislatures of Maryland and Virginia, then in session, with a promptness which entitles them to the public gratitude, concurred in an act, incorporating a company as desired, and investing it with ample powers. This act was subsequently acceded to by the legislature of Pennsylvania in the same liberal spirit." As provided by the State of Maryland as a condition to the stock of the company, the road was so located, "that it shall go to or strike the Potomac River at some point between the mouth of the Monocacy River and the town of Cumberland, in Allegheny county, and that it shall go into Frederick, Washington, and Allegheny counties." Subscriptions for stock were opened; the amount required by the charter was immediately filled; a board of directors elected, and work begun in the fall of 1828. The ceremony



of laying the first stone had been performed with patriotic jubilations on the previous fourth of July. Having reviewed the difficult engineering already accomplished with the aid of several improvements invented by "the genius and science of American citizens," the company, through its president, expresses, without doubt, its belief "that the graduation, masonry, and construction with a double set of tracks may be accomplished between the present termination of the road and the Ohio River at or nearly within the original estimated cost of twenty thousand dollars per mile, and that in the event of the requisite funds being placed at the disposal of this company, the whole work might be completed and put into operation in five years."

President Thomas ends his report with the prophecy that the State of Maryland "will soon find herself, in point of commercial activity and capital, second to no State in the Union," "by securing to herself the channel through which the interchange of commodities between the eastern and western States will mainly pass, and which her position gives her an opportunity of effecting." Mistaken in this expectation—the writer hopes Maryland will pardon the remark—it may also be forgiven that President Thomas did not anticipate the time when an express train would run from Paris to Constantinople, and when on our own continent, Canada, the United States and Mexico would present a continuity of communication by means of railroad. At the same time his patriotic anticipations are being increasingly manifested in the United States. President Thomas, as the document under review demonstrates, was a far-sighted man, who loved his country dearly, and his work all the more because it anticipated its unprecedented progress, and that unity of interests between its States which is the surest bond of permanent union.

"It is certain," he says, "that whatever advantages may be anticipated from the railroad system in Europe, they will be of minor importance when compared with the benefits we are destined to derive from the introduction of this system into our country. By the easy, convenient, and rapid intercourse which these roads afford, they are capable of placing, almost in juxtaposition, the most remote sections of our widely extended republic, and will thus do more to perpetuate our institutions and preserve our Union than any political compacts or physical force could ever effect. The system, if advantageously applied and sufficiently extended, will give to the people of the United States an identity of feeling, or harmony of interests, and a facility of social intercourse, which must long bind them together as one great family; and to secure to our country all the advantages resulting from the productiveness of a mighty continent, with the conveniences of communication incident to a small island."

In an earlier part of his report, President Thomas remarks that the ordinary speed attained upon the Liverpool and Manchester Railroad, at the time he penned it, was from fifteen to thirty miles an hour; "and," he adds, "it is even asserted, that the whole distance of thirty-two miles, between these places, has been run in thirty-three minutes, or at the rate of fifty-eight miles per hour." It appears from this statement that in the matter of speed the attainable then was about equal to the attainable now, a fact patent to every well-informed reader.

(To be continued.)

#### Coming Exposition at New Orleans.

THE Cotton Centennial Exposition, to be opened at New Orleans on the first Monday in December, 1884, and closed not later than May 31, 1885, will have a class of railway apparatus, divided as follows:

Plans, models, drawings, surveys, etc.; permanent ways, station arrangements. Models of engines, of systems of traction, of apparatus pertaining to railways. Models, plans, and drawings of platforms, stations and engine-houses, and other buildings necessary for the working of railways. Separate parts—Springs, buffers, couplers, combined coupler, buffer, and platforms, brakes, trucks, snow-plows, pilots, wheels, tires, axles, bearings, ties, chairs, switches, rails, crossings, fish-plates, turn-tables, feeding-cranes, tanks, boltless rail joints, automatic railway signals. Locomotives, tenders. Rolling stock—Passenger cars, sleeping cars, dining cars, buffet cars, freight cars, refrigerator cars, smoking cars, stock cars, construction cars, hand cars, inspection cars. Automatic brakes for freight trains, power brakes for trains, speed and distance indicators, automatic bell-ringers for locomotives, throttle-valves, portable jacks, optical and acoustic signals. Miscellaneous locomotive attachments. Special tools and machines for the maintenance, repair, and construction of railways. Railway machinery and supplies of every description. Apparatus and system for inclined planes and self-acting planes. Apparatus and engines for atmospheric railways. Permanent ways for street railways; apparatus and systems of street railways.

CONSUL-GENERAL SCHUYLER, of Athens, writes that the government of Greece has called a commission of French engineers to decide upon roads and to survey for railways. It is proposed to make several networks of roads, and to intrust their building to contractors taken from various countries, so as to entice foreign capital into Greece. Up to the present year but one railway has existed in Greece—from Athens to the Piræus, a distance of five and a quarter miles. A few months ago another short railway was opened on the western coast of Peloponnesus, from the port of Katakolo to the town of Pyrgos, eight miles. A railway is now in course of construction from the Piræus and Athens, to Patras by the way of Corinth, about 136 miles, and it is expected that it will be opened from here to Eleusis in the autumn. Another railway is projected from Athens to the mines of Laurium, thirty-six miles. The concession has been given, but no work has yet been done. Work is being actively pushed on the Thessalian railways from Volo, the chief port, to Larissa, the capital of the province, with a branch from Velestina to Kalabaki; in all, 128 miles. This is to be part of the great railway line which is to connect Athens with the rest of Europe. A connecting link will be made from Athens through Lamia to the Thessalian railway. It is expected that the same company will build a railway on the Turkish side of the frontier, connecting Thessaly with Salonica and the railway which now runs from that point northwards, and is shortly to be prolonged to Belgrade and Vienna. Two lines of tramway have been laid down in Athens, and a steam tramway from Athens to Phaleron.

THE Texas and St. Louis Railroad has passed into the hands of a receiver.

## Lubricating and Lubricants.

BY E. F. DIETERICHS, CLEVELAND, O.

## III.

## TESTING LUBRICANTS.

THERE are many methods resorted to for testing lubricants as to their relative value as such. The testing machines in general use enable us to decide, with some degree of correctness, how far a lubricant recommends itself for practical use without fear of causing injury to the machinery. Such tests, however, are necessarily on too small a scale, and the time too limited to permit ascertaining correctly the merits or demerits of a lubricant for regular practical use, and the effects from interfering influences, as for instance on a locomotive, such as the scorching heat of the sun in summer, the sudden chilly blasts of cold in winter, the constant and irregular vibration, snow and hail and the flying cinders and dust acting on the lubricant. These can only be determined by practical and prolonged use.

Some of the animal and vegetable oils will outrun the best mineral oils on a testing machine, yet under practical and prolonged use can barely hold their own on account of their liability to decomposition under the influence of frictional heat, and the above-mentioned interfering influences. As cylinder oils, fatty matter is still more subject to decomposition, undergoing in the cylinder of an engine precisely the same treatment of exposure to steam under pressure as is resorted to in the process of manufacture of stearine and the fatty acids. From the small quantities thus decomposed at a time in a cylinder, the accumulations become perceptibly troublesome only after some time, and no testing machine can demonstrate this important fact on so limited scale and short test.

Lubricating is a chemical process. If the theory were correct that cushion-forming metallic and inert matter can relieve continuous friction, then lubricating would be a purely mechanical action, which it is not; but as thorough lubrication involves the vaporization of interposed substances, that is, the passage of matter from the solid or liquid to a gaseous state, and we have to make use of this chemical property of a change of state in order to relieve the moving metallic surfaces from frictional heat, we are bound to consider lubricating as a chemical process, not a mechanical one, and we can therefore judge the efficiency of a lubricant by its chemical characteristics and by the chemical influences which in practice it is exposed to.

The lighter and more essential fatty acids from the different fatty matter represent the odor peculiar to each oil or fat respectively; the more rank (that is decomposed) they are, the more prominent is their characteristic odor. They do not become rank as easily in cold as they do in warm weather, and thereby show that little heat can decompose them and set their acids free. The slight amount of frictional heat produced by rapidly rubbing the hands together will start their acids, and a small amount of oil or fat thus rapidly vaporized will enable us to recognize most of them by their peculiar odor, and thereby also detect the presence of free, fatty acids. Chemistry teaches us that all fatty matter can be saponified and can be decomposed, and its component parts separated by the influence of steam and pressure. When we therefore ascer-

tain the presence of free, fatty acids in a cylinder lubricant by the frictional heat created by the rapid rubbing between our hands, we can safely surmise that such lubricant must undergo like decomposition in a cylinder. If the odor indicates the presence of light hydro-carbons, we can surmise that the constituents of the lubricant are too volatile to be safe for practical use. If the odor is a neutral one, that is such as not to indicate any one particular odor, we can surmise that the lubricant is made of heavy hydro-carbon oils or such in connection with fatty matter unable to vaporize as light hydro-carbons or as free fatty acids.

By pouring a drop of the samples to be compared on clean and close blotting paper, we can, by the slow or rapid penetration, judge as to their difference in viscosity as well as to their difference in purity, as the more limpid or too light oil will run through faster, and all tarry or inert matter will be left behind long after the limpid part of the sample has passed through or has diffused itself along the paper.

Pouring some of the lubricant to be tested on to the warm slides or bright surface of an upright engine, the more rapid descent of the one or slower flowing of the other, will indicate their superior or inferior clinging power at elevated temperature, and their respective cleanliness by the trail they leave behind.

As a preliminary test engineers often pour a few drops of an oil to be examined on to the hot plate of the cylinder-chest, and call it a poorer oil for evaporating faster than another, yet we prove thereby only that it possesses a lower fire test; we may there also show its diffusing or diffusion resisting property under heat, its resinous drying character and its liability to decomposition, but what reliable inference can we draw from all this as to qualification for cylinder lubricant when we consider that the heat on the cylinder-plate is a dry and scorching one, while inside, where the lubricating is to be done, the heat is a moist one, and while resinous deposits from oils containing resinous matter may be shown on the cylinder-plate, even from a small quantity, the gummy deposits left from lard oil and like oils inside a cylinder will escape detection? nor can we ascertain thereby what fire test would be most appropriate for cylinder oils. For railroads, the setting apart of an engine expressly built for the purpose, and supplied with all necessary contrivances to ascertain sudden and progressive heating, all parts so arranged as to increase or relieve tension at will, provided with feeding facilities easily changed or made adaptable and practicable for all kinds of lubricants it may be desirable to test, and above all in charge of an intelligent operator, theoretically and practically well-informed on the subjects of machinery, lubricating and lubricants, would by far be the most efficient and economical testing machine. While at the same time performing some regular work, testing and recording could be carried on, and most practical results and an endless amount of information on the subject of lubricating and lubricants, and the many ways of doing it, could be obtained.

For want of new tests to be made, and while running with the lubricant in use on the road, the constantly observing and recording engine would detect all fraudulent changes as to quality of the lubricant periodically supplied for the road, and would set at rest all one-sided complaints as to shortcomings from causes entirely for-



eign to it. A similar plan could be adopted by all large manufacturing establishments where a number of stationary engines and lots of duplicated machinery are in use; and even in smaller establishments a particular bearing could be selected and fitted for the purpose, under exclusive control of an intelligent and trustworthy operator.

(To be continued.)

### MEXICAN NOTES.

*Adapted from the Mexican Financier.*

THE President of Honduras has granted a very valuable railroad concession to three New York capitalists, William H. Warner, H. K. Wheeler, and M. O. Sheldon. A land grant of eight square miles on each side of the track for each mile of road constructed is to belong to any company organized by these gentlemen, and completing a railroad by August 1, 1887, from Trujillo, a seaport of five thousand inhabitants to the Roman River, a distance of twenty miles. The road is then to extend for a distance of fifty miles up the Arenal valley. It will traverse a country very rich in cabinet and dye woods.

A CONCESSION has been granted to General Alonso Flores for the construction of a railway line from Tampico to Victoria through Altimara, Presas, the hacienda of Santa María and La Sierra, with the branches necessary for local traffic; also from Victoria through Hidalgo and Rio Blanco, terminating in Matehuala with a branch to Padilla, and other branches which may be necessary. The gauge may be either narrow or broad. A subsidy of \$4,500 a kilometer of narrow-gauge track is granted.

THE action of the Government, in relation to the approaching world's exposition in New Orleans, commends itself to public approbation. General Porfirio Diaz will without doubt act personally as commissioner general from Mexico, and Messrs. E. G. Gillow and Mariano Bárcena have accepted their appointments as commissioners to act in conjunction with Mr. G. H. W. Timbrell.

THE concession to Gen. Carbó for the construction of a railway from Mazatlan to Rosario in Sinaloa, with an extension to a junction with the Mexican Central in the District of Tepic, is regarded as a highly important and valuable one, and will give the Pacific line of the Central access to the leading port on the Pacific coast.

THE Mexican Central is building its own freight cars, the frame work being of oak from the company's forest at Nardo, while the pine comes from the forests near Pátzcuaro in Michoacan, whence it is hauled to the Mexican National at Morelia and delivered to the Central at Celaya.

A CONCESSION has been granted to Mr. José Matilde Alcocer for the construction of a railway from the port of Celestun in Yucatan through Merida and Hunucmá to Sotuta, with a branch to Teabo, with a subsidy of \$5,500 a kilometer.

THE Mexican Navigation Company's steamship Estéban de Antunano, to ply between Vera Cruz, Galveston and New Orleans, is being built in Sunderland, England. The ship, which is to cost \$160,000, is to be finished in September.

THE hotel being built by the Atchison, Topeka & Santa Fé Railroad Company at Guaymas, will be a fine structure

and will probably rival the company's grand hotel at Las Vegas Hot Springs in the completeness of its appointments.

THE cities of Mazatlan and Rosario have granted a concession of \$2,000 a kilometer to the railway company chartered to build a line between those two important places.

PULLMAN sleepers will be used on the Mexican Central Railroad, from El Paso to the city of Mexico, after April first.

JAMES H. LANCASTER, of No. 36 Dey street, New York, president of the Lancaster Manufacturing Company, has purchased the entire plant, patterns, and good will of the business of J. H. Darlington, (Harlem Railroad Depot), corner Centre and Franklin streets, New York. This business was founded by Mr. J. H. Darlington, some thirty years ago, and has been in successful operation ever since. The present plant and patterns cost Mr. Darlington upwards of thirty thousand dollars, and to this Mr. Lancaster will add considerable additional machinery, including Universal Milling Machines, Monitor Lathes, and a complete set of emery, grinding and polishing machinery. In addition to the general work hitherto carried on at these works, Mr. Lancaster will build his new patent Caloric Motors and Caloric Pumping Engines, Drop and Trip Hammers, Dynamo Machines, Arc Lamps, Steam Engines, and also such work of the Lancaster Manufacturing Company, as this plant is suited for. New floors (120 feet by 25 feet) are being laid, and every preparation is being made for increasing the manufacturing facilities of the concern. About fifty men will find employment at these shops. At present the business is being conducted solely by James H. Lancaster, but it is intended by him to organize a stock company, capitalized at \$500,000 and styled "The J. H. Lancaster Engineering Company." The directors of this concern will be men of high standing in the mechanical world. This business will be conducted distinctly from that of the Lancaster Manufacturing Company, which was successfully founded by Mr. Lancaster some eighteen months ago.

THE advertisement of S. C. Anderson, No. 93 Duane street, New York, in the present issue, is important to railroad and all other great business interests. It directs attention to Zuccato's Papyrograph, a copying machine in use by the American and United States Express companies, the Equitable Insurance Company, the New York Board of Health, the Department of Public Works, New York, the Manhattan Railway Company, H. K. & F. B. Thurber & Company, etc. This machine enables an office boy to take autograph copies of any letter at the rate of four hundred per hour. Its applicability, moreover, in multiplying circulars, price lists, specifications, designs, notices, postal cards, envelopes, or manuscripts of any description gives it an unequalled range of usefulness. All copies made by its means are perfect. We confidently advise correspondence with Mr. Anderson.

THE difference between the trunk lines and the Lackawanna has been compromised by the provision that the latter shall enter the pool, and differences between it and the trunk lines shall be settled by a new board of arbitration in the place of the regular arbitrator.

## Hints from Recent British Patents.

A NEW rail for railways and tramways is built up of two similar sections, having a somewhat Z shaped section, giving four perfect and independent flanges. In certain railway brakes and springs a steam piston and cylinder are opposed by a vacuum piston and cylinder, the two pistons being on the same piston rod; when the vacuum is destroyed in the main pipe, the steam applies the brake, and when the vacuum is again formed it overcomes the steam piston and takes off the brakes. Tickets to be issued to passengers in public conveyances have counterfoils, and are dated, etc; they are strung on a wire, one end of which passes into a locked drawer in the money-taker's office in such manner that the counterfoils pass into the drawer as the tickets are sold, and thus act as checks. A system of railway signaling and apparatus and fittings connected therewith shows mechanism, which will slide an arm carrying detonating signals over the rails and withdraw it, and which is combined with the mechanism working the "semaphore" signals. A railway ticket is composed of two pieces of card united on three sides, forming a convenient receptacle. In an improvement for use in electric railways, the armature of the dynamo motor is made of larger diameter than that of the driving wheel, the object being to dispense with gearing; the track has a depression between the rails, which allows of the passage of the armature. In new railway carriage lamps, the gas jet or flame inclosed in a small air-tight glass of semi-globular form is arranged at the lower extremity of a chimney having a suitably protected outlet for the products of combustion and consisting of a tube having a number of longitudinal folds or corrugations; this chimney is inclosed in an outer tube of heat-retaining materials and is provided with protected inlets for air. As a system and means for communicating between trains in motion and between trains and stations, a contact wheel is mounted in the forked end of a rod whose other end is embedded in an insulating substance inclosed in a box bolted to the engine; the contact wheel runs on an insulated rail or conductor laid down between the rails, and makes contact therewith. To secure rails in the permanent way of railways, one of the jaws is removed and the remaining jaw is strengthened externally; the base of the chair and the inner jaw are hollowed out to receive the rail, and the base receives a movable jaw or clamp.

IN Mr. Edwin Hutchinson's report on color blindness, addressed to the railroad commissioners of New York State, to which reference was made in the January issue, the learned writer pays a handsome tribute to Dr. B. Joy Jeffries, of Boston. To him, he says, "the thanks of all citizens are due for his untiring energy in investigating the subject of color-blindness. He, through his valuable book, and in lectures and written articles, has done more than any one else to awaken public interest in the dangers which arise from this cause. It is but just to Dr. Jeffries, as the pioneer of the movement in this country, to state that what he has claimed as necessary, and has always argued for, is simply the legal enactment of standard requirements of visual power and the color sense, adjusted to the several positions of employes, these standard requirements to be tested for by standard methods, through competent experts legally appointed."

WE have received the report of the Committee on Uniform Train Signals, for the use of the railway lines of the United States and the Dominion of Canada, made to the General Time Convention, Chicago, October 11, 1883, and published by order of the convention. It contains the recommendations of the committee on hand and lamp signals, bell-cord signals, whistle signals, stationary and fixed signals, torpedo signals, and the use of signals. The valuable pamphlet under review is published by the National Publication Company, No. 46 Broad street, New York. Copies are forwarded to the officers of railroads on application to the secretary, W. F. Allen, same address.

THE Railway Specialty Manufacturing Company, No. 30 Vesey street, New York, are making Horne's Safety Switch Stand, which is used on some of the leading railroads of the United States. It is strongly and simply constructed, and consists of but four pieces, put together with three bolts; size, two feet long by two feet high, and weighing, complete with targets and connecting rods, 260 pounds. We learn that after ten months of service, it is found to give entire satisfaction.

EX-JUDGE ERNOTT has given Judge Green, receiver of the North River Construction Company, an opinion upon the question, as to what effect any lien by contractors, laborers or material men, under any statute, could have upon the right of bondholders under a first mortgage of the New York, West Shore and Buffalo Railroad Company, declaring that no lien can disturb or obtain precedence of a lien created by an existing first mortgage, by which outstanding bonds are secured.

THE arguments of Mr. James E. Gowen, Mr. Franklin B. Gowen, Hon. George M. Robeson, and Hon. B. Williamson, counsel for defendants on the motion for a preliminary injunction, in the case of *Dinsmore vs. The Philadelphia & Reading Railroad Company et al.*, delivered in the United States Circuit Court at Trenton, New Jersey, in November, 1881, have been published at Allen, Lane & Scott's Printing House, Philadelphia.

RAND, AVERY & COMPANY, of Boston, will publish in the coming spring, a story "involving the pregnant question of Mormonism." Their belief is that "the thrilling and powerful tale" referred to "will hasten the day for the uprising of an indignant nation, and their verdict will be as in the case of slavery—this disgrace must cease—the Mormon must go!"

IT is stated in a San Francisco journal that Attorney-General Marshall is inclined to abandon the tax suits against the Central Pacific Railroad Company and accept the proposition of the company's attorney, Mr. Haymond, to pay the full amount of taxes for 1880, 1881 and 1882.

THE Burton Stock Car Company, Boston, is building two of their patent stock cars for one of the Australian governments, to be used as samples. If found satisfactory, one hundred more will be built for the same destination.

THE railroad commissioners of Kansas have ordered a reduction in freight rates by all roads in that State, of from nine to forty per cent., an average of about fifteen per cent. on the entire classification.

THE National Tube Works Company have leased a large storeroom at No. 802 North Second street, St. Louis, and open to the trade a full line of pipes, tubes, etc., ready for prompt shipment.



## Tramway.

### American Street Railway Association.

*President.*—William H. Hazzard, Brooklyn, N. Y.

*First Vice-President.*—James K. Lake, Chicago, Ill.

*Second Vice-President.*—George B. Kerper, Cincinnati, O.

*Third Vice-President.*—D. F. Longstreet, Providence, R. I.

*Secretary and Treasurer.*—William J. Richardson, Brooklyn, N. Y.

Office of the Association, cor. Atlantic and Third Avenues, Brooklyn, N. Y.

### THE TWELVE HOURS BILL.

THE Assembly now in session at Albany has revealed the stuff it is made of, by passing to a third reading, a bill which provides that street railroad companies shall work their employes not longer than twelve hours a day, or, if longer, pay them extra compensation. As only twenty-eight members voted against the passage of the bill, and were defeated by odds of more than three to one, the division indicated an overwhelming preponderance of allied stupidity and demagogism in the lower house. In this respect, New York may not be worse off than her sister States. Intelligent citizens here, as elsewhere, appreciate the advantage to the commonwealth implied, as a general thing, in the absence of honorable members from their duties at the Capitol. When its doors are closed business men feel at rest from the mischievous meddling which, in these degenerate days, passes for statesmanship, and is too often the parent of legislation. In the particular matter under consideration, there remains hope that the bill will get no farther than it has already proceeded; and as the debate preceding its passage to its present stage, considered as a whole, was a first-class "circus," there seems to be wisdom in thus regarding it, and in enjoying to the full the mirth its perusal abundantly affords.

And this in spite of the temptation to moralize on the contemptible want of principle evidenced by men who posed as friends of the working-classes, and cast their votes on the catch-vote system. Not that we believe the majority in the division to which reference is made, was composed exclusively of such persons. There probably were some who gave an honest vote, and conscientiously believed themselves to be, and undoubtedly were, actuated in that sublime act, by a humane regard for their over-worked brother man, the conductor or the car-driver. But it is surely laughable that such men as these, sent up to Albany to legislate in the interests of the Empire State, however big their heart, have not head enough to perceive that the attempt to govern the relations between employer and employed, both being free agents and adults, is a mischievous interference with business, and, if successful, would furnish a precedent for endless interferences of the same kind, injurious to the interests of the

entire community. The argument as cleverly put by some speakers of the minority, is simply unanswerable, and would be irresistible if presented to persons other than those who either have a method in their madness or unhappily want the ability to discriminate between the impulse of pity for men who work long hours on small wages, with the perfect right to find employment elsewhere and in another occupation, and the broad and far-reaching scope of view which alone is true statesmanship. If the schoolmaster—with his rod—is so badly needed in Albany, how much more are his services required among the people who choose, presumably, the best representative men, to shape practical wisdom into legislation.

THE Rapid Transit Commissioners of this city have had a lively time of late. Inventors galore have clamored for recognition, and the competing claims of superiority in the respective systems shown them, must have tried their patience and discrimination to a high degree of tension. We have reason to believe, however, that the gentlemen appointed by Mayor Edson to report if a necessity exists for more rapid transit facilities in this city, in what parts of New York these are needed, the kind of power, other than horse-power, to be used, and to form and open to subscription a company, are equal to the tasks laid upon them. So far they have shown at least the diligence which is an ingredient of success in their work, and we anticipate the conclusion of their labors with hopeful expectations.

### Recent British Patents Relating to Tramways.

THE inner and outer rails of a tram rail are formed separate, and the uppermost surface of each rail is formed similarly to the lowermost surface; a longitudinal groove is formed in both sides of each rail to receive a base plate placed between the two rails, and serving as the bottom or sole between the pair of rails, the outside grooves, for the time being, serving to receive the cotters or keys for fixing the rails in position. The object of an improvement in tram cars is to cause the drawbar to act at the circumference of the wheel (and not at its centre as is usual) when starting the vehicle. To facilitate the starting of tramway cars, etc., only one lever is employed for stopping and starting the car, the brake when applied causing the power to be stored up in a spiral spring, which power is available for assisting in the starting of the car. An invention provides that the wheels for tramway vehicles are made without the usual flat tread, and are adapted to run in a central V or rounded groove of the rail, so that the bearing is wholly in the groove. The head of the rail is notched so as to present a roughened surface to prevent slipping of the wheels. The rails are supported on chairs connected together by cross ties, and are secured by bolts passing down through the chair, and secured by a nut fitting in a slot. When required to brake a vehicle, air pumps driven from the axle are caused to compress air into suitable receivers, and when starting the vehicle

the compressed air is used as a motive power in the said cylinders.

The body of a vehicle for road traction is provided with rails which run on wheels on platforms or rests carried on endless chains, which, during traction, run over pulleys on opposite sides of the vehicle.

#### The Rasmussen Cable System.

THE patents of this system are owned by the United States Cable Railway Company, Chicago, to whom letters of inquiry should be addressed. Charles W. Rasmussen is the patentee.

Space admits of scarcely more than the mere mention of the advantages claimed for it; advantages, by the way, which an examination of the model makes plain.

The Rasmussen cable system has no grip connecting the cars with the moving cable. It dispenses with the costly iron and concrete tunnel employed in other systems, having in place of this costly excavation, a small slotted iron tube measuring six by eight inches, more or less. This can be built directly to the cross ties of the track, and be flush with the surface of the road-bed. The use of such a tube is made possible by the fact that no fixed pulleys are required to support the cable, nor is there any grip to travel in the tube, but the cable is sustained by a series of two-wheeled trucks traveling upon rollers formed integral with the tube; and the attachment of the car to the constantly moving trucks is effected by means of moving arms projecting from the car through the slot of the tube, and readily controllable by the operator from his position on the front platform of the ordinary passenger car, so that the car can be stopped and started at pleasure. These arrangements make it obvious why a tunnel is dispensed with in the new system. The small tube described as taking its place can be laid directly upon the cross ties of ordinary horse-car tracks without interfering with the road-bed further than the removal of the central paving blocks. Friction on the traction cable is *nil*, because the arms of the car are caught by the cable-supporting trucks and not by the cable itself, so that whether the car moves at a lower rate of speed than the cable, or be at a standstill, still the cable can travel without friction. This obviously could not be the case were it passing through the jaws of a grip. Moreover, there are no stationary pulleys in the tube to constantly wear the cable. The cars can be gradually or instantly moved or started as desired, because the same movement by the operator which releases the cable also applies the brakes to the running wheels; and any speed is practicable. In case of there being an obstruction on the track, the car can be lifted therefrom, as the arms by which the car is connected with the moving cable are removable from the slot of the tube at any point in the roadway. As there are no fixed pulleys within the cable tube, it can be kept constantly clean by means of brushes or scrapers attached to the traveling cable. We are advised that the cost of introducing the Rasmussen is about one-fifth of the money expended on those systems already in operation. Two of the chief reasons of this economy are the saving due to the absence of tunneling, and that the cars now in use as horse-cars are perfectly available, with inexpensive additions, to be run by the Rasmussen cable system.

All the apparatus on the car consists of two drums, one at each end, over which passes the flat endless chain, on which are the three arms passing to the slot of the tube, as above described. The endless chain is regulated by a friction band passing over one side of each drum. Brakes are double acting, one movement braking the wheels of the car and controlling the friction band on the drum.

#### Automatic Spring Motor.

THERE is now on exhibition at the offices of the New York Automatic Spring Motor Company, No. 39 Nassau street, this city, the model of an automatic spring motor which certainly suggests availability on street railways. The patents cover several applications of the principle of the combination of springs on which it is constructed, among them, to the street car, to the locomotive engine, to elevators in buildings, and to such small machinery as the coffee mills used in grocers' stores, etc.

It is claimed that the use of the automatic spring motor on street railways would prove very economical. Fifteen hundred dollars is all the outlay necessary to complete the car for the track, including all machinery. This, moreover, is operated by one man, and so easily that, if desired, the services of a conductor can be dispensed with, the person in charge of the machinery being able to discharge his duties as well as to give proper attention to his own.

A car is being constructed in Philadelphia which will contain eighty springs, eight sets of ten springs each. Each set will be inclosed in separate cylinders, and each will have its own gearing. The power of eighty springs is sufficient for a run of eight miles. The entire force will not be used at any time. That of one set of springs will be exhausted before that of another set will be used, and each set will carry the car one mile. No difficulty is anticipated with regard to grades, the calculation being that a grade of six hundred feet to the mile can be covered without trouble. The grade question is met in this way: progress will be made on the level with one set of springs. Reaching a grade, shall it become necessary, force will be augmented by working another lever, thus releasing the force of another set of springs, and so on, to the use of as many as will be found necessary. The new car will have a front swing truck, lessening friction and enabling it to take short turns. It is likewise anticipated that, by means of the front swing truck, the car will be easily removable from the track in case of obstruction, and will be run around it. To stop the car, there will be provided a treadle to act upon a double-action band brake, locking both axles and stopping the car within the space of six feet.

Some minor features of the invention are a governor which may be set to determine the maximum speed of the car, and which has an indicator that will show the amount of reserved force left in each set of springs. It will be seen that the breakage of one spring would reduce the power of an eighty-sprung car, only one-eightieth part, with the corresponding proportion of loss of speed. At the end of the route the broken spring would be repairable at the cost of five dollars, in two hours.

TWENTY-SIX new railroad routes in New York are proposed.



## History of Traction By Cable.

## II.

THE writer will endeavor in this letter to give a history of the earliest inventions of cable traction; and as these patents were all taken out in the early part of the present century it will be readily seen that even then much attention was given to this method of transportation, and that all the basic principles of cableways were anticipated. The first in order was the invention of William Francis Swendon, of Oxford street, London, who on the eighteenth of December, 1824, procured a patent for a "new invented wheelway and its carriages for the conveyance of passengers, merchandise, and other things along roads, railways, and other ways, either on a level or an inclined plane." It does not appear that this invention was ever applied to the operation of a railway of any sort whatever, but it will be noted that it contained the first essential idea of the cable railway—namely, the tube. The inventor proposed also to adopt a similar arrangement to the foregoing, for the towing of barges by erecting his patent wheelways by the sides or banks of canals or rivers. This invention as has been stated, did not come into actual use, and is referred to merely on account of its novelty and the fact that it embraced a tube.

But a certain William James, of London, devised a railway actuated by an endless chain or cable, for which a patent was granted him February 28, 1824. His invention was adopted and applied in the practical operation of the Dundalk Railway, Glasgow, about four miles in length, which continued in operation for several years, until it was superseded by the inventions of Cartes and Stephenson and Bidder. This consisted essentially of a traveling cable, which by means of a flexible link overcame depression pulleys at grade or curve. See *Glasgow Mechanics Magazine*, pages 193-199.

The next invention of importance in the history of cable railways was that of Stephenson and Bidder, for which a patent was issued in 1839, and which was applied on the London & Blackwall Railroad, some six miles in length.

Prior to this date, however, October 31, 1839, a patent had been issued to Mr. Cartiss for a grip or ground rope apparatus for attaching a train to an endless moving cable, or detaching it therefrom, and Messrs. Stephenson and Bidder adopted this invention in the operation of the London & Blackwall Railroad. He specifies it as a machine for connecting or disconnecting a train with a ground rope whilst the rope is in motion. The above road was operated for a long time, and in the AMERICAN RAILROAD JOURNAL of last October was published an account of the experience of a gentleman who had traveled on the road.

Readers will by this time have very plainly perceived that the tube grip and the cable are by no means new, but are older than the system of street car travel or transportation.

The next improvement in the cable railway system was made by Robert William Brondling, of London, who was granted, on October 30, 1845, a patent for improvement in railways and railway carriages. His improvement consisted in a new method of gripping cables by means of compression bars or dies, and a device for driving an endless cable by means of stationary engines, the gripping device being carried and operated from the carriage. This

is the first instance on record of the combination of cable in tube under track between rails and gripper for engaging cable operated from car.

Mr. Brondling describes his invention as follows: "My invention consists in constructing a machine by which the railroad trains are firmly attached to or easily liberated from the rope which draws them; in causing the trains to pass upon the surface without any obstruction to the usual traffic along the public highways; in conforming the machine and rope below the surface and in a new mode of communicating the tractive power to ropes used on railways." His invention was applied on the inclines in Suffolk County, England, and Bidder also adopted a portion of his improvements on the London & Blackwall Railroad. The invention was chiefly used on inclines so steep that locomotives could not be employed upon them.

Thus it will be seen that the whole system of cableways was fully anticipated up to 1845, put in operation and successfully used for years in different parts of England, the whole essential ideas fully developed and carried out.

In this exemplification the writer has not crossed to our own country at all, but has simply quoted from old works giving details of the operation of these old expired patents.

By taking the whole system as indicated in this article, a successful cable railway can be operated, and hence it follows that anyone can take advantage of the prior state of the art and operate cable ways. The patents obtained since are simply improvements upon the previous inventions, and their value consists in that fact and that only. No one can claim the exclusive right to a system for operating cable railways, and all should abandon such a claim, and rest upon the strength and force of the improvements made in the inventions.

In conclusion, it is proper to state that these articles are prepared under the direction of Mr. A. H. Lighthall, that the valuable collection of books from which this information is drawn, have all been procured by him, and that any merit that there may be in these articles is solely due to his vast knowledge and ability in regard to this particular subject on which they treat.

In the next issue will be given a portion of the history of American inventions and operations, showing that early American inventions anticipated the latter-day improvements. Cable railroads are destined to become the popular motor in the transportation of street railways. There is room for all, and it is far better for the owners of lines that an exclusive monopoly should not exist. This Lighthall Cable Traction Company, Washington, D. C., does not claim a monopoly. It believes in live and let live, and that a reasonable outlay for patents with an interest in stock and franchises is the most just and reasonable way to deal with those wishing to change existing horse car lines to the cable system.

(To be continued.)

THE rectified oil of tar, popularly called the spirit of tar, mixed with twice its bulk of fish oil, when well rubbed with a brush every night, on both crust and sole, is said to be an eminently good application for hardness and brittleness in horses' feet.

THE Rapid Transit Commissioners, New York, completed their scheme of railroad routes on February 9.

## TRAMWAY NOTES.

**EVILS OF HEATED CARS.**—In a communication to the *New York Tribune*, E. L. Atmore, M.D., says: "The habits of New Yorkers, consequent upon living long distances from business, are to blame for much of the prevalent pulmonary troubles. Let's take an average case, say of a man living in Brooklyn. He leaves a warm—possibly too warm—fireside in the morning. He is close-buttoned to the chin. He walks a block to the street car, and the exercise warms him up. He jumps into the car and finds the atmosphere close. Feeling heated, he throws back his overcoat. Before he reaches the end of the line he begins to feel chilled and pulls it tightly about him. At the Bridge or ferry he shivers as he comes from the street car to the entrance. He may and probably does get warm again on the boat or Bridge car. But the same chilling process is repeated at the other end of the line, and he reaches his place of business half benumbed. This is all the result of sudden changes from the outside cold to the inside heat. He gets a cold and a hacking cough that hang on all winter. The mucous lining of the throat is affected, bronchial troubles come on, or pulmonary disease sets in. While the public is always crying for heated cars and ferry-boats, it would be better for public health if none of them were heated. Passengers would then be subjected to a steady temperature, and knowing what to expect, would act accordingly."

THE New York Rapid Transit Commissioners, in the multiplicity of their arrangements, have listened to an explanation of the flexible road bed invented by O. C. Woolson, formerly inspecting engineer of the New York Elevated Railroad. In this system the ties upon which the rails rest are made in two parts or strips, the bottom strip resting on the girder and the top strip bearing the rails and rail guards. Between the strips is a space an inch in height, except in the middle and at both ends, where the strips are bolted together. Under the weight of a car or a locomotive the rails and upper strip will sink down into the center space about one-eighth of an inch, and will rebound when the pressure is removed. The claim in regard to this invention is that at all times the cars will have a road bed safe, steady, and free from inequalities, and that the ties will wear longer than if solid. Mr. Woolson advised the building of a platform two feet below the regular platform now in use at the elevated railroad stations, the idea being that such a platform would catch all persons dragged by trains beyond the railings of the station.

THE *Germantown Telegraph* says: "As long as we can remember, this singular fit of obstinacy in the horse has been discussed, and all sorts of plans given for overcoming it. It must be remembered that what will prove a remedy for one horse will not for another. The original cause of it is, doubtless, neglect and ill treatment of the colt, or after it has been broken to harness. Sometimes stopping a few moments will be sufficient to start the animal again of its own accord. Kind words, patting, a handful of hay or grass, an apple, or a little black pepper put upon the tongue, will induce it to go ahead as if nothing had been the matter. Whipping, at all times, and especially in this case, is the worst resort. We have ourselves induced balky horses to quietly start by some of these means, and one was entirely cured of it by letting it

stand until it went on again of its own will. Sometimes the mere turning of the head and letting the animal look in a different direction, or rubbing the nose, has answered; so has tying a string around the foreleg below the knee and drawing it rather tight. Various resorts of this kind should be adopted, but never force."

THE Haddock cable system, now in use in Cincinnati, has been examined by Lewis Lyon, president of the Third Avenue and 125th street railways, New York; Edward Lauterbach, attorney, and William H. Payne, engineer of the Brooklyn Bridge, who are reported to have expressed themselves highly satisfied with it. This system is claimed to be the only system operated by a single cable that will turn at will to the right or to the left or cross at right angles another cable with grip and cars. A patent secures to the company the right to lay telephone or telegraph wires in the cast-iron tunnel in which the cable runs. The cost for building in this system will not exceed \$40,000 per mile, it is claimed. The company has proposed to introduce, at its own expense, a new system for working the cars on the Brooklyn Bridge, but the trustees have thus far taken no action.

WORKING models, plans, and specifications of construction of the Riley Elevated Railroad have been shown the New York Rapid Transit Commissioners by Frank A. Bartholomew, president of the company. In this system the cars run on a single rail, and are kept in position by safety wheels and guards on each side of the superstructure, two feet below the bearing rail. It is claimed that under no circumstances can the cars be derailed. The cost per mile for construction is estimated at \$75,000. During the coming summer a two-mile section of this road will be in operation at Rockaway Beach.

S. M. ANDREWS, proprietor of the Fifth Avenue (New York) stages, says: "There has been no money in stages this winter. We have had to pay men to shovel snow, and also had to double up our teams so that it took all our stock to keep half our stages running. There has been bad weather ever since Christmas; part of the time the avenue was so full of holes in the snow that a stage-ride would make one sea-sick. Stages have broken down and horses been sprained and otherwise injured. But we carry a good many people in spite of the elevated roads and street cars."

AN English exchange informs us that a company has been formed to construct and work a cable tramway between places ten and a half miles distant. The machinery is driven by water, the power being derived from a river, at a point half-way between the two termini, where the stream is twenty-eight inches deep by thirty-five feet wide, with a speed of sixty-five feet per minute. The track is to be of three feet gauge, and the pulleys carrying the cable are to be above it. The journey is to be made in one hour.

THE Second Avenue cars, this city, are warmed by a small furnace or heater attached to the under side of the floor upon one side, and midway between the wheels. The fire is fed and regulated from the outside. A pipe conducts the smoke to a corner of the car, where it is carried to the roof by a vertical pipe. The heated air is let into the car through perforated tin registers immediately over the furnace.



Two Baltimoreans, George A. Dubreuil and Richard Gornall, have had on exhibition in this city, models showing a system of traction by means of a steel band instead of cable. This can be worked from either below or above the car. The Rapid Transit Commissioners spent a long time inspecting the system, of which a detailed account will be given in a future issue.

In the Allen Bicycle system for an elevated railroad, as explained to the New York Rapid Transit Commissioners, the cars run on a single rail, supported on light posts. It is claimed that a train attached to a locomotive using a driving-wheel fifteen feet in diameter can be driven at the rate of 120 miles an hour.

THE total length of street railways in operation in Amsterdam, Holland, on January 1, 1883, including sidings and double-tracks, was about 29,945 meters, or about 18¾ miles. Total length of streets through which tracks are laid is 20,670 meters, or nearly thirteen miles.

ONE of the horse-car companies in Brooklyn has provided each of its conductors with an apparatus which records the fare, and gives the passenger the opportunity of noting the time, a watch with a conspicuous dial, forming part of it.

To induce an increase of passenger traffic, one of the street-car companies of Cleveland, Ohio, displays placards promising that no cents shall be given in change. They are received for fares but not given out.

THERON R. BUTLER, president of the Sixth Avenue Railroad Company, New York, is dead. He became president of the Sixth Avenue Railroad Company in 1865, and was also a director of the Erie Railroad Company.

DR. THOMAS S. LAMBERT claims that his grooved track pavement would solve the problem of both slow and rapid transit on Broadway, New York.

IN his recent visit to San Francisco, General Hancock was greatly interested in the workings of the cable railway system.

#### List of Recent Patents for Inventions Relating to Tramways.

BEARING DATE JANUARY 1, 1884.

- 291,055. SHOE FOR HOOF-BOUND HORSES: William H. Hendricks, Whitehall, Ind. Filed Nov. 3, 1883.
- 291,138. AUTOMATIC STREET-RAILWAY SWITCH: Earl Bill, Cleveland, Ohio. Filed June 9, 1883.
- 291,144. CABLE-MOTOR: Charles R. Brown, Imperial, assignor of one-half to William McCreery, Pittsburgh, Pa. Filed Sept. 7, 1883.
- 291,229. BLINDER FOR HORSES: Bernard Rice, Brooklyn, N. Y. Filed May 17, 1883.
- 291,325. HAME: Fred Frazer, Syracuse, N. Y. Filed Nov. 14, 1883.
- 291,341. SAND-BOX FOR STREET-CARS: George H. Hathaway, Fairhaven, Mass. Filed Nov. 16, 1883.
- 291,357. HITCHING DEVICE: James L. Kennedy, Sioux City, Iowa. Filed Sept. 29, 1883.
- 291,365. HALTER: John C. Lighthouse, Rochester, N. Y. Filed June 18, 1883.
- 291,390. HAME-FASTENER: Marsh Noe, Davenport, Iowa. Filed Sept. 1, 1883.

BEARING DATE JANUARY 8, 1884.

- 291,589. TRACTION-ROPE RAILWAY: Eleazer S. Gardner, Philadelphia, Pa., assignor of two-thirds to John H. Gould, same place, and Oliver L. Gardner, New York, N. Y. Filed June 8, 1883.

291,594. CAR-STARTER AND BRAKE: George M. Hathaway, New York, N. Y., assignor of one-half to Charles C. Keeler, same place. Filed June 2, 1883.

291,596. BRIDLE: Marcellus M. Hitt, Luray, Va. Filed Feb. 24, 1883.

BEARING DATE JANUARY 15, 1884.

291,896. TRACE-FASTENER: Nickolas Martin Habberstad, St. Paul, Minn. Filed May 7, 1883.

291,898. CABLE-RAILWAY PROPULSION: William Wallace Hanscom, San Francisco, Cal. Filed Sept. 10, 1883. Patented in England Aug. 16, 1882, No. 3,927, and Nov. 29, 1882, No. 5,690.

BEARING DATE JANUARY 22, 1884.

292,165. CABLE-RAILWAY PROPULSION: William Wallace Hanscom, San Francisco, Cal. Filed Oct. 3, 1883.

292,300. HORSESHOE: Albert E. Hall, Quincy, Minn. Filed June 28, 1883.

292,360. HARNESS-SADDLE: Alonzo C. Rickey, Boone, Iowa, and Edwin D. Myers, Wooster, Ohio. Filed April 30, 1883.

292,379. CAR-AXLE BOX: John Stephenson, New York, N. Y. Filed April 21, 1883.

BEARING DATE JANUARY 29, 1884.

292,483. PROPULSION OF STREET-CARS AND OTHER VEHICLES: Neil F. Graham, Falls Church, and Howard H. Young, Carlin Springs, Va. Filed May 29, 1883.

292,624. PILOT OR GUARD FOR CARS OF CABLE-ROADS: Wm. U. Bohm, San Francisco, Cal. Filed May 4, 1883.

292,655. RAILROAD T-RAIL: Tom L. Johnson, Indianapolis, Ind. Filed Feb. 20, 1883.

292,759. ROLL FOR ROLLING CAR-RAILS: Arthur J. Moxham and John R. Tranter, Louisville, Ky. Filed Oct. 23, 1883.

#### Sand Box Attachment for Street Cars.

GEORGE H. HATHAWAY, Box 242, Fairhaven, Massachusetts, has been granted letters patent on his sand box attachment for street cars. It has been used on the cars of the New Bedford and Fairhaven Street Railway Company and elsewhere, and has given entire satisfaction.

The attachment is operated inside the dasher at either or both ends of the car, where is placed a spring which, on being pressed by the driver's knee, causes the valve to open, and the sand, which is placed in a box under the car seat, passes through a short pipe directly in front of the wheel. The flow of sand is regulated by the force used in pressing the spring, or by a ratchet outside the dasher that may be adjusted so as to deliver a constant stream of sand at any gauge. By a device on the end of the distributing pipe, the clogging of the pipe by mud is avoided. It is claimed that the attachment works equally well on either grades or level roads, and that it will be found a safeguard against accidents, and will effect a great saving in wear of brakes.

THE San Francisco *Bulletin* prints a description of the proposed cable road up Telegraph hill, in that city, from which it appears that the road will be about 1,700 feet in length. Two separate cables will run in two trenches, similar to those in common use. To one end of each cable a car will be permanently attached by an arm extending down from the car, through a slot to the trench. The power required will be supplied by engines at the upper terminus, having link motion, so that one car can be allowed to unreel its cable and run down its own track by power of gravitation while the other car will be hauled up on the other track. Each cable will be supplied with an electric conductor connecting the car with the engine-room. The cars will be twenty-two feet long, half open and half closed, and mounted on four wheels instead of four-wheeled trucks; and the cable of the usual type.

## New Inventions.

### IMPORTANT TO INVENTORS.

THIS department of the AMERICAN RAILROAD JOURNAL is devoted to descriptions of the many and interesting New Inventions applicable to railroads, and in order to make it as complete as possible, inventors whose improvements properly come under this description, are invited to send us a detailed account of the same. This should consist of facts only, presented in clear and concise language, written only on one side of the paper, and the sheets numbered consecutively. In all cases in which it is desirable and practicable, the written description should be accompanied by a cut or cuts illustrating the invention. This or these should be marked distinctly on the bottom, with the name and address of the sender. All cuts received are preserved at this office, or returned, if desired, to the person sending them to us for use. As we have an engraving department we are prepared to make cuts, and furnish estimates of our charges for the same to those persons who write us for such particulars. That we may estimate exactly and without delay, it is necessary that we have sent to us, a photograph of the Model and a copy of the Specifications.

The reader of course understands that the editors reserve their inalienable rights to decide what "copy" they shall use, what changes shall be made in it, if any, and when they shall use it; but they guarantee the impartial consideration of every description sent them.

Descriptive articles relating to Tramways will be placed in that department.

### List of Patents for Inventions Relating to Railways, Machinery, Etc.

#### BEARING DATE JANUARY 1, 1884.

- 291,049. APPARATUS FOR LAYING RAILROAD-TRACKS: Chas. R. Goodman, Hammond, Ind. Filed May 9, 1883.  
 291,073. STATION-INDICATOR: Chas. W. Musgrove, Lock Haven, Pa. Filed Sept. 6, 1883.  
 291,095. RAILWAY-TRAIN SIGNAL APPARATUS: Chas. Selden, St. Louis, Mo. Filed April 2, 1883.  
 291,109. CAR-BRAKE: Marshall Turly and Reuben T. Bryant, Council Bluffs, Iowa. Filed Oct. 12, 1883.  
 291,110. MACHINE FOR ROLLING COUPLING-PINS: Robert Richardson Turner, West Middlesex, Pa. Filed March 10, 1883.  
 291,113. DUMPING-CAR: Matthew Van Wormer, Melrose, Mass. Filed Sept. 8, 1883.  
 291,120. LOCOMOTIVE-BOILER: John E. Wooten, Philadelphia, Pa. Filed Aug. 23, 1883.  
 291,136. STOCK-CAR: Anthony Berdanier and Adam F. Berdanier, Philadelphia, Pa. Filed Aug. 16, 1883.  
 291,149. CAR-COUPLING: Daniel Carlough, Paterson, N. J. Filed Nov. 26, 1883.  
 291,180. APPARATUS FOR OPERATING RAILWAY-TRAINS: Bernard Frese, Chicago, Ill. Filed March 31, 1882.  
 291,182. SNOW-PLOW: David B. Garton, Barrie, Ontario, Canada, assignor of one-half to Edmund C. Edmonds, Albany, N. Y. Filed Aug. 24, 1883.  
 291,210. CAR-COUPLING: Pierre Mayrand, Montreal, Quebec, Canada. Filed Oct. 27, 1883.  
 291,232. RAILROAD-JOINT AND FASTENING DEVICE: Sumner Shaw, Boston, Mass. Filed Feb. 3, 1883.  
 291,247. OILER FOR CAR-AXLE BOXES: Geo. K. Waterhouse, Boston, Mass., assignor to himself and James Morse, same place. Filed June 11, 1883.  
 291,263. CAR-SEAT: William A. Ackley, Hackettstown, N. J. Filed July 7, 1883.  
 291,289. CAR-COUPLING: John C. Bryan, Holly Springs, Ark. Filed Oct. 17, 1883.  
 291,290. CAR-COUPLING: George W. Butler, Knoxville, Tenn. Filed Oct. 31, 1883.  
 291,360. RAILWAY BLOCK SIGNAL: John K. Knight, New York, N. Y., assignor to William H. Baker. Filed July 24, 1882.  
 291,363. SAFETY-DOOR FOR RAILROAD-CAR PLATFORMS: Frank Lappin, Baltimore, Md., assignor of one-half to Virgil Walker, Philadelphia, Pa. Filed Nov. 7, 1883.  
 291,382. CAR-TRUCK: William H. Montz, Lehigh, Pa. Filed Sept. 10, 1883.  
 291,385. CAR-COUPLING: David E. Morgan, Detroit, Mich., assignor of one-half to Adam G. Monroe, same place. Filed Oct. 22, 1883.  
 291,404. CAR-DOOR FASTENING: Salisbury F. Rosse, Sedalia, Mo. Filed Aug. 6, 1883.

- 291,411. CAR-DOOR: Wm. W. Shallus, Lancaster, Pa., assignor of one-half to Henry H. Keen, same place. Filed Oct. 10, 1883.  
 291,446. CAR-COUPLING: Ransom S. Wheeler and James Wheeler, Red Oak, Mo. Filed June 23, 1883.

#### BEARING DATE JANUARY 8, 1884.

- 291,495. DEVICE FOR STOPPING RAILWAY-TRAINS: John Wills Cloud, Altoona, Pa. Filed June 23, 1883.  
 291,498. CAR-COUPLING: Charles Devlin, Pembroke, Ontario, Canada. Filed Oct. 1, 1883.  
 291,514. RAILROAD-TIE: Henry R. Holbrook, Pueblo, Colo. Filed May 2, 1883.  
 291,523. RAILWAY-TRACK: John George Krichbaum, Youngstown, Ohio, assignor of one-half to John C. Klossenstein, same place. Filed Feb. 17, 1883.  
 291,545. RAILWAY-SIGNAL: Abraham B. Snyder, Louisville, Ohio. Filed Aug. 27, 1883.  
 291,547. BEARING FOR CAR-AXLE JOURNALS: Geo. W. Stewart, Atlanta, Ga., assignor, by direct and mesne assignments, to Edmund Holland, same place, Gustavus G. Lansing, New York, N. Y., Theophilus P. Brown, Toledo, Ohio, and Geo. W. Smith, Lafayette, Ind. Filed May 29, 1883.  
 291,556. ELECTRIC RAILWAY-SIGNAL: William Vogel, Chicago, Ill., assignor of one-half to William T. Underwood and Bernhard Schram, same place. Filed May 15, 1883.  
 291,572. CAR-COUPLING: John C. Bryan, Holly Springs, Ark. Filed May 4, 1883.  
 291,590. MAGNETO-ELECTRIC RAILWAY-SIGNAL: Wesley Ward Gary, Boston, Mass. Filed Aug. 18, 1881.  
 291,613. TRACK AND ROAD-BED FOR RAILWAYS: Harvey C. Lowrie, Denver, Colo. Filed Oct. 2, 1882.  
 291,618. CAR-WHEEL: Geo. W. Miltimore, Chicago, Ill. Filed Aug. 10, 1883.  
 291,622. RAILWAY PASSENGER-CAR: William H. Paige, Cleveland, Ohio. Filed Aug. 29, 1883.  
 291,624. RAILWAY-SWITCH: Byron Rice, West Schuyler, N. Y. Filed Aug. 29, 1883.  
 291,675. SNOW-PLOW: Pierre Brunet, Toronto, Ontario, Canada. Filed June 14, 1883. Patented in Canada Aug. 20, 1883, No. 17,529.  
 291,713. DRAFT-REGULATOR: Wm. F. Grassler, Williamsport, Pa. Filed Aug. 4, 1883.  
 291,721. RAILWAY-SIGNAL SYSTEM: William Hadden, Brooklyn, N. Y. Filed Feb. 19, 1883.  
 291,749. FILLING FOR RAILROAD-FROGS: George C. Lucas and John A. Patterson, Cleveland, Ohio. Filed May 3, 1883.  
 291,764. RAILWAY PASSENGER-CAR: Edwin P. Osgood, Malden, Mass. Filed Nov. 12, 1883.  
 291,801. CAR-DUMPER: Thomas S. Stewart, Saltsburg, Pa. Filed Nov. 26, 1883.  
 291,804. RAILROAD SWITCH-STAND: Charles H. Talmage, Atchison, Kans. Filed March 16, 1883.  
 291,807. CAR-WHEEL: Harrison G. Taylor, Toronto, Ontario, Canada. Filed July 18, 1883. Patented in Canada Aug. 15, 1883, No. 17,495.  
 291,826. FLUID-PRESSURE CAR-BRAKE: Robert J. Wilson, Pittsburgh, Pa. Filed Oct. 13, 1883.  
 291,841. CAR-BRAKE: Simon Fairman, Baltimore, Md., assignor of one-half to John G. Mitchell and William S. Taylor, both of same place. Filed Sept. 21, 1883.  
 291,847. LUBRICATOR FOR LOCOMOTIVES: Clarence B. Hodges and Charles H. Hodges, Detroit, Mich., assignors of one-half to Henry C. Hodges and Charles C. Hodges, both of same place. Filed Nov. 7, 1883.
- BEARING DATE JANUARY 15, 1884.
- 291,868. DETECTING-BAR FOR RAILWAY-SWITCHES: James A. Bonnell, New York, N. Y., assignor to the National Interlocking Switch and Signal Company, same place. Filed Feb. 9, 1883.  
 291,908. RAILROAD-SWITCH: Robert H. Isbell, New York, N. Y. Filed Feb. 14, 1883.  
 291,911. CAR-COUPLING: William H. Jones, Martinsburg, Iowa. Filed Oct. 12, 1882.  
 291,913. NUT-LOCK: Samuel P. Kimball, Woodstock, Ohio. Filed Dec. 7, 1883.  
 291,914. METHOD OF AND APPARATUS FOR PRESERVING AND TRANSPORTING FOOD: Samuel Henry Linn, New York, N. Y. Filed Sept. 18, 1883.  
 291,929. RAILROAD-SIGNAL: James R. Park, La Vergne, Tenn. Filed July 6, 1883.  
 291,960. CAR-COUPLING: Milton R. Thurber, Scranton, Pa., assignor of two-thirds to Alfred Harvey and Horatio Patrick, both of same place. Filed July 6, 1883.  
 291,988. RAILROAD-SWITCH: John H. Crowley and Bernard M. Temple, Galveston, Texas. Filed July 13, 1883.



- 292,029. RAILWAY TORPEDO-PLACER: Gilson Warner Metcalf, Baltimore, Md. Filed Sept. 27, 1883.  
 292,074. CAR-COUPLING: Chas. Uebinger, St. James, Ind. Filed Oct. 20, 1883.  
 292,126. CAR-COUPLING: Thomas Jefferson Miller, North Manchester, Ind., assignor of one-half to Marcus L. Harter same place. Filed Nov. 3, 1883.  
 292,144. RAILWAY-SWITCH: Edward Stone, Cortland, N. Y., assignor of one-half to John Hodgson, same place. Filed July 18, 1883.  
 292,146. SUPERHEATING ATTACHMENT FOR STEAM-BOILERS: James Andrew Stout, Belleville, Ill., assignor to the Harrison Machine Works, same place. Filed Nov. 26, 1883.

## BEARING DATE JANUARY 22, 1884.

- 292,192. RAILWAY-CAR: Richard H. Wyman, Evanston, Ill. Filed Nov. 23, 1883.  
 292,223. RAIL-JOINT: Charles F. Hartman, Keller's Church, Pa. Filed April 26, 1883.  
 292,246. AUTOMATIC CAR-BRAKE: John D. Miller, Big Sandy, assignor of one-third to Thos. M. Miers, Dallas, Texas. Filed June 11, 1883.  
 292,248. CAR-SPRING: Harvey J. Mitchell, Philadelphia, Pa. Filed Sept. 21, 1883.  
 292,267. CAR-WHEEL: Theodore Thomas, New York, N. Y. Filed June 15, 1883.  
 292,268. CAR-COUPLING: Walter Turnbull, New Orleans, La. Filed Nov. 17, 1883.  
 292,278. CAR-COUPLING: Charles W. Bond, Toledo, Ohio. Filed Sept. 13, 1883.  
 292,301. NUT-LOCK: John W. Haley, North Hartland, Vt. Filed Dec. 3, 1883.  
 292,336. COAL-CAR: John D. Madeira, Chillicothe, Ohio. Filed Dec. 10, 1883.  
 292,339. CAR-COUPLING: Cassius McArthur, South Shenango, Pa. Filed Nov. 3, 1883.  
 292,399. CAR-AXLE BOX: William S. G. Baker, Baltimore, Md. Filed Sept. 21, 1883.  
 292,421. RAILWAY-TIE: Jas. J. Du Bois, Springtown, N. Y. Filed Aug. 28, 1883.  
 292,429. CAR-BRAKE: George M. Hathaway, New York, N. Y., assignor of one-half to Charles C. Keeler, same place. Filed Aug. 9, 1883.  
 292,430. CAR-COUPLING: Marshall Hayden, New Milford, Pa. Filed Dec. 4, 1883.  
 292,452. BRASS FOR CAR-AXLE BEARINGS: John Wallace, Albany, N. Y., assignor of one-half to Geo. T. Weaver, same place. Filed Mar. 6, 1883.  
 292,454. CAR-TRUCK: Andrew Westlake, Leadville, Colo. Filed July 3, 1882.

## BEARING DATE JANUARY 29, 1884.

- 292,472. WATER-CLOSET FUNNEL OF RAILWAY-CARS: Isaac H. Congdon, Omaha, Nebr. Filed July 20, 1883.  
 292,499. CAR-SEAL: Thomas H. Malone, Milwaukee, and George A. Whiting, Neenah, Wis. Filed July 16, 1883.  
 292,504. ATTACHMENT FOR LOCOMOTIVES: La Fayette Willson Page, Shreveport, La. Filed March 26, 1883.  
 292,506. CAR-COUPLING ADJUSTER: John P. Pies, near New Washington, Ohio. Filed Nov. 21, 1883.  
 292,507. NUT-LOCK: John F. Plummer and Henry P. Chapman, Essex, Conn. Filed Dec. 12, 1883.  
 292,538. CAR-COUPLING: John Coup and David McCurdy, Cleveland, Ohio, and William B. Rice, New York, N. Y. Filed Oct. 1, 1883.  
 292,553. COMPENSATING DEVICE FOR SIGNALS: David S. Gardiner, Hudson, N. Y. Filed Sept. 26, 1883.  
 292,557. CAR-COUPLING: Francis A. Hoyt, West Cleveland, Ohio, assignor of two-thirds to L. H. Ware and J. W. Moore, both of same place. Filed June 12, 1883.  
 292,564. CAR-COUPLING: Charles G. McCormick, Cincinnati, Ohio, assignor of one-half to George L. McCormick and John N. McCormick, both of same place. Filed Jan. 27, 1883.  
 292,595. SLEEPING-CAR: John Shorey, Lowell, assignor of two-thirds to Phineas E. Merrihew, Fairhaven, Mass. Filed May 17, 1883.  
 292,641. AUTOMATIC RAILWAY-GATE: George F. Forbes, Hyde Park, Mass. Filed April 16, 1883.  
 292,675. CAR-ROOFING: William H. Paige, Cleveland, Ohio. Filed Oct. 1, 1883.  
 292,687. RAILWAY-SWITCH CIRCUIT-CLOSER: Chas. A. Scott, Boston, Mass. Filed April 16, 1883.  
 292,698. CAR-COUPLING: Milton M. Shur, Washington, D. C. Filed Dec. 5, 1883.  
 292,702. RAILWAY-JACK: Morton B. Somes, Fennville, Mich. Filed Dec. 1, 1883.

- 292,704. CAR-COUPLING: William Stamp, Susquehanna Depot, Pa. Filed Sept. 15, 1883.  
 292,712. BELL-RINGING ATTACHMENT FOR LOCOMOTIVES: Pennock M. Way, Thurlow, Pa. Filed June 12, 1883.  
 292,724. CAR-COUPLING: Parker Wineman, Chicago, Ill. Filed Nov. 19, 1880.  
 292,736. AUTOMATIC CAR-BRAKE: Joseph C. Dane, La Croix, Wis., assignor of two-thirds to Lucinda S. Card and Forrest J. Smith, both of same place. Filed April 13, 1883.  
 292,743. INTERLOCKING-SWITCH APPARATUS: Oscar Gassett, Boston, Mass., assignor to the Union Switch and Signal Company, Pittsburgh, Pa. Filed Dec. 4, 1882.  
 292,744. ELECTRIC SIGNALING APPARATUS FOR RAILWAY-CROSSINGS: Oscar Gassett, Boston, Mass., assignor to the Union Switch and Signal Company, Pittsburgh, Pa. Filed March 26, 1883.  
 292,760. SPARK-ARRESTER: Peter Murray, Indianapolis, Ind., assignor of one-half to Patrick Murray, Alma Mine, Evanston, Wyo. Filed Aug. 13, 1883.  
 292,773. CAR-SPRING: Richd. Vose, New York, N. Y. Filed May 24, 1883.

## Improved Window for the Cab of Locomotives.

THIS new contrivance is the device of John Shields, of Hancock, Houghton County, Michigan. It has for its object to provide a window which may be opened, so as enable the engineer to have a free lookout along the track, and at the same time protect him against the weather and smoke and cinders from the engine, while it may be slid forward, if desired, in the manner usual in this class of windows, leaving the window entirely free and open. The means to this end may be briefly indicated as follows:

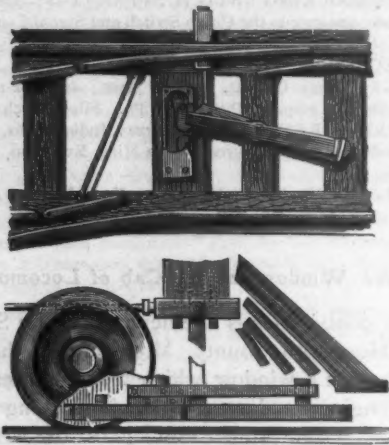
The cab frame is provided with a fixed window and a sliding frame in which is hinged a window. To prevent interference with the sliding of the window and its frame, the hinges are sunk into the frame. A bar bent in the end, is hinged to the swinging window. The bent end of this bar is adjusted to engage in a series of staples or bails upon the inside of the bottom piece of the sliding frame in which the swinging window is hung. This provides for the opening of said window at any angle desired. Upon the inside of the bottom piece of the frame is a staple adapted to receive the bent end of the bar above mentioned, and to hold the sliding frame either closed or slid back in front of the fixed window, while a turn-button or swivel serves to hold the swinging window closed. In this manner it will be seen that the swinging window may be opened at any desired angle, protecting the engineer in looking out, while, when desired to have a perfectly free lookout, or when the engine is passing objects near to the track, which might come in contact with the window, it may be closed and slid forward in its ways in the same manner as windows usually employed in locomotive cabs. A sector-shaped plate may be hinged to the upper edge of the swinging window in such a manner that it may be extended to cover the opening on top between the swinging window and the sliding sash, forming a protection from objects from above, and be folded down when it is desired to slide the window forward.

A NEW kind of vertical steam boiler has been invented by Mr. Armer. The object of the design is to obtain the greatest possible efficiency in the steam-heating surfaces. In order to effect this, the tubes have a helical twist given them, which does not interfere with the ease with which they may be cleansed, but which causes greater impingement of the gases against the tube walls, and gives more freedom for expansion than straight tubes.

**The Fay Automatic Safety-Switch.**

AMONG the important railway inventions may be mentioned the Automatic Safety-Switch, recently patented by Albert T. Fay, 715, 4th street, S. E., Minneapolis, Minn.

This invention consists of a switch-lever contrivance and apparatus to be attached to a locomotive to enable



the switch to be shifted by the locomotive or not, at the will of the engineer, the shifting apparatus being contrived to be set by steam for shifting the switch to right or left, the switch being self-locking, and arranged so that when open, the switch-rails can be shifted by the wheels so as to pass it in one direction, after which the rails will be shifted back by a spring arrangement in the switch-bar, so contrived for enabling the train coming upon the main line and wanting to back off over the switch, to change the switch before passing it, so that after passing the said switch it will be set for backing off on the branch. The switch-rail is connected to the switch-bar by springs in such a manner as to allow the rail to be shifted along the bar so that when the switch is set for the siding, as represented in the cut, a train moving to the right hand will shift the switch-rail by the flanges of the wheels, so as to pass the switch safely, and after the train has passed, the spring will set the switch again, so that the train may back on to the branch. In order to control the switch from the train when the latter is moving in the opposite direction—that is from right to left—a lever is arranged upon the ties between the rails, to be shifted by a shifter attached to the locomotive acting on the stud of the lever, said lever being arranged on a fulcrum point, and connected with the switch-bar by a pin. The end of the switch-lever projects into the lock-case, to be locked after shifting the switch, by the spring catches. A trip-lever, which is pivoted to the switch-lever, is arranged to trip the catches when the switch-lever is to be shifted; said lever having a vertical arm working in a slot in the stud, and being a little wider than said stud, it always projects a little beyond the side of the stud on which the shifter is to act, and is thereby moved far enough before the shifter acts on the stud to enable the bevel corners to unlatch the catches and free the switch-lever at the moment when the shifter strikes it. The springs forming the connection of the switch-rail with the switch-bar or cushion, the shocks when the train, running rapidly, shifts the switch by the lever to pass along either the main line or the branch.

The shifter consists of a point-headed bar suspended by

a shaft from a steam-chest which is bolted to the under side of the cross-beam of the pilot.

The upper end of the shaft has an oscillating piston working in the triangular steam-space, the steam being admitted to and exhausted from opposite sides of the piston through ports, according as the live steam or the exhaust passages of the valve register with said ports. Live steam is taken direct from the boiler by means of suitable connections.

It will be noticed that when the valve stands in the central position, both sides of the piston are open to exhaust. A movement of the valve to the right will close the exhaust and open the steam cavity to the port on that side, admitting steam to shift the piston to the left. The reverse motion of the valve will effect a reverse motion of the piston, and the piston thus swings the shifter to the right or left at the will of the engineer, who works the valve as required by a lever located in the cab of the engine.

The range of the shifter is limited by a stud-pin in the upper side of the front end of the shifter, which engages stops attached to any part of the engine suitable for arresting the lever and supporting it when it strikes the stud. To return the shifter to the middle position and retain it there, so that it will pass the switch-lever without shifting it, a couple of springs are made to bear against said stud, said springs being attached to supports mounted on a guard that is suspended from the locomotive. This guard is for the purpose of preventing the switch-lever from rebounding after being shifted, by its edges holding the lever in the position to which it is shifted for a short time thereafter, while said guard is passing the stud of the switch-lever, to allow the catches time to engage it.

It will be seen that the engineer has by this contrivance complete command of the switch, whichever way his train may be moving, and whichever way the switch may be, whether open or closed. The switch can be shifted by hand if required.

Further information can be obtained by addressing the inventor as above.

**Electric Motor.**

In electric motors, a continuous current of electricity, when it is generated, is utilized as a motive power. That one of which a general description is appended, was invented with the object to produce a machine that will utilize all or the greatest amount of electro-magnetic force produced by the circulation of a continuous current of electricity through an electric conductor and its accessories, for the production of motive power; and also for the propulsion of other machinery not of a locomotive character. The inventor and patentee is William L. Silvey, of Castleton, Indiana, whose pen is familiar to readers of this journal. In his specification, Mr. Silvey enters into a minute description of the underlying electric principle which all electro-motors should embrace. Said specification, which is too long for insertion in these columns, forms part of letters patent No. 269,888, dated January 2, 1883. It contains reading useful to all who interest themselves in the subject of applying electricity in industrial processes.

To attain his present object, Mr. Silvey has devised an



electric motor which, he claims, is capable of utilizing the following forces: first, the attraction and repulsion of electro-magnets; second, the attraction and repulsion of a coil of wire through which a current is flowing toward a magnet; and, third, the attraction and repulsion of two or more coils through which currents are circulating.

#### A Railway Bridge Indicator.

ELAM A. GROSS, Camden, New Jersey, has invented and patented a device for indicating the approach to bridges or tunnels on railway tracks. It consists of a series of wires suspended transversely across and above the track and suitably fastened ahead of the bridge or tunnel; provided with bells or other suitable sonorous alarms at their lower ends, and with depending wires adapted to operate said bells or alarms when struck by a person or persons standing on the roof of the cars. The picture of this novel device shows a post or upright, with an arm extending transversely, and at a suitable distance above the track. This arm is provided with staples or similar fastenings, from which depend a series of wires. Below these are bells, one on each wire; and below the bells depend wires, one from each bell. The theory is, that when these lower wires are brought in contact with a person or persons standing on the roof of a car, the bells to which they are attached will ring.

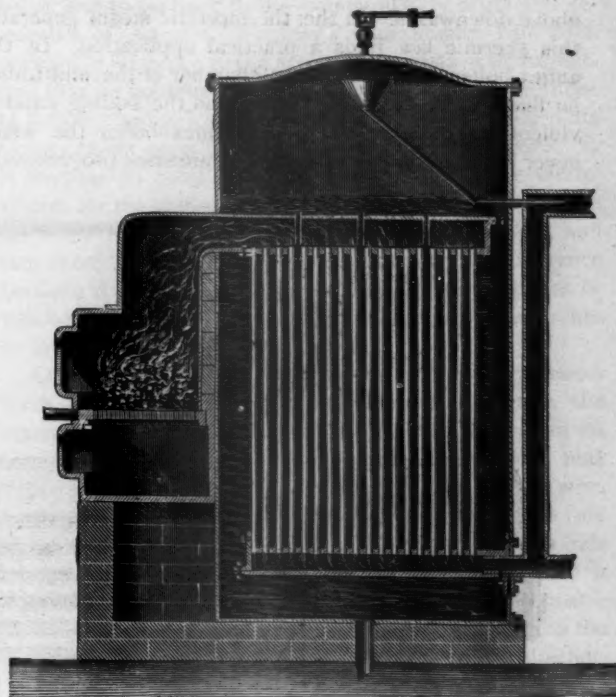
#### Steam Generator.

THE United States patent, No. 289,989, issued December 11, 1883, to Joseph E. Culver, M. D., Jersey City, inventor, embodies several novelties of interest, and provides for the practical application of thermodynamic laws long familiar to the scientific world, but hitherto ignored in the construction of steam generators.

The furnace shown in the accompanying drawings is like an ordinary furnace, inasmuch as it has a grate with a fire-pot and combustion chamber above, and an ash-pit beneath, a door above the grate for feeding the fuel, and a door below the grate for removing ashes and for admitting air, etc. But besides these, there is shown appended a secondary combustion chamber, separated from the primary combustion chamber by a partition. A narrow flue, opening through the top of this partition, connects the two chambers. An upper air inlet extends from the furnace front along the apex of the primary combustion chamber, and discharges heated air to mingle with the flames just at the mouth of the entrance to the secondary combustion chamber. Within the primary combustion chamber, hydro-carbonaceous gases distil forth from the blazing fuel, ignite, and are in part consumed. The secondary combustion chamber is not a retort to receive fuel and generate additional supplies of inflammable gases; but, rather a reverberatory into which pours a stream of burning flame and hot air, therein to tarry a little and complete the combustion. To secure the best results, the two combustion chambers must be capacious; especially their vertical measurements should be large, relatively, to the area of the grate surface.

The secondary combustion chamber also operates as the upper flue chamber of a thermostatic flue system. It is connected with a lower flue chamber by a series of boiler tubes so arranged that the tubes shall all commu-

nicate with each other through the medium of the chambers they connect, the fuel gases escaping from the lower chamber through a suitable discharge pipe. The fuel gases, while traversing such a flue system, are thermostatically balanced; and successive strata of flames and gases, hottest at top and coolest at bottom, follow each other downward through every flue in unchangeable order, the coldest foremost. A thermostatic flue system may be constructed of tubes only, or of chambers suitably con-



nected, or of any suitable combination of chambers and tubes, arranged within the water space of the boiler below the water level, and freely intercommunicating one with another, especially at their lowermost parts, so connected with the furnace and with the smoke-stack, that the smoke shall traverse them in a downward direction from the furnace to the exit flue, so intercommunicating that the descending smoke in every flue, and in every branch and segment thereof, shall be left free to descend according as it is cooled and its gravity is increased, or to maintain a higher level according as it retains its heat rarefaction, so that the descending smoke preserves in all the flues at the same level a uniform temperature, a thermostatic equilibrium not liable to be disturbed by variable drafts, and that smoke which has cooled the most is at all times foremost in the descent.

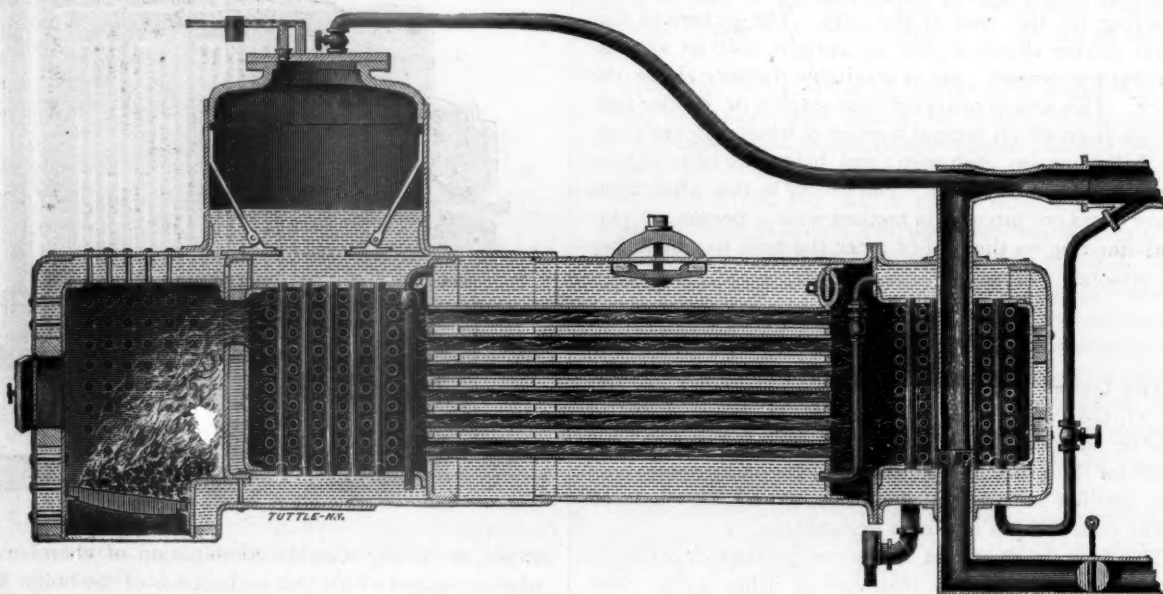
Experiments have fully shown that a fire in the double chambered furnace with thermostatic flue system as described, will, if quickened by a steady and powerful indraft of air, driven by a flue exhauster working in the distal end of the discharge flue, burn with an energy that no carbonaceous combustible can withstand. The gaseous products of such combustion as delivered at the exhaust, consist almost wholly of carbon dioxide, nitrogen and steam, without a particle of dust, smoke or cinder. A weak, unsteady draft will not secure perfect combustion in any furnace; the strong, uniform, artificial draft, is a *sine qua non*.

When the furnace and thermostatic flue system combined are inclosed within a boiler shell, and are surmounted by an annex boiler, whose upper part is the steam dome, and whose base and fire plate is the crown-sheet roof of the combustion chambers, the construction as a whole constitutes a thermostatic steam generator. It is to be fitted with all requisite supplementary apparatus and self regulating attachments, and jacketed.

Water is almost an absolute non-conductor of heat by continuity. Neither water nor gases transmit heat from above downwards. In the thermostatic steam generator this thermic law finds a practical application. In the annex boiler, above the upper chamber of the multitubular flue system, steam is formed, and the boiling water is violently agitated. Below the annex boiler the water never boils, and its temperature diminishes progressively

per pound of coal consumed, or discharge its gaseous products of combustion at so low a temperature. Of the numerous possible constructions of the thermostatic steam generator, we regard the simplest as the best. The designs for use at the Patent Office were necessarily complicated.

The artificial draft preferred for use with the steam generator, is made by fitting a steam pipe into a narrow flue so as to terminate centrally therein, and discharge steam forth coincidently with the long axis of the flue. The outgoing steam, according to its tension, creates a vacuum in the flue behind the steam junction, sweeps the gases from the furnace onward, and mingles with them. This apparatus can produce a most economical artificial draft; it can yield a very powerful blast. When all the steam from the generator is passed through it, namely: under a pressure of three or four atmospheres, and the



down to the bottom of the water space; no bubbles rise therefrom; there are no interstratic currents; all is motionless there, save that the feed water, which is added little by little, uplifts the mass integrally of which it forms the base. In the water outside of the flues, as in the hot gases within them, like temperatures rest in horizontal planes throughout, but from top to bottom of every vertical section of the water space, each horizontal plane is a little cooler than the one next above it. The intensest heat of the furnace is in the summit of the combustion chambers, underneath the fire plate of the annex boiler; and as the fuel gases descend thence through the flue tubes and the lower chamber, they impart their heat to the water surrounding them, until they reach the escape flue comparatively cold; and, conversely, the water entering the boiler at the bottom, is heated as it rises, step by step, in apposition with warmer and warmer strata of gases, until at length, already surcharged with heat, it comes upon the fire plate of the annex boiler and is almost instantaneously converted into steam. The product is dry steam, and the rate of production is believed to be unrivaled. The patentee states that no steam generator other than the thermostatic, can produce so much steam

temperature of the fuel gases discharged therewith exceeds somewhat that of the steam, the mixture comprehends under a diminished tension all the heat-force developed from the fuel consumed. Such a mixture, of any desired steam pressure, can be used for heating purposes, or to operate engines on steamships or elsewhere, wherever a large quantity of low pressure steam is worked. A check valve fitted in the flue behind the steam junction acts automatically and prevents reversal of the draft.

A boiler-spray from the coldest water in the boiler is employed to condense the exhaust steam from high pressure cylinders, or temper the products of combustion employed as a source of motive power.

Moreover, the two-chambered furnace and thermostatic flue system are adaptable to hot air furnaces, which, it is claimed, will unite a saving of two-thirds of the fuel with increased heating capacity, and at the same time give perfect security against the smoke nuisance and the dangers of overheated flues.

On the first of January, 266 applications were recorded at the English Patent Office, the largest number thus far. On that day the new act went into operation.



## New Method of Electric Lighting.

THE Gaulard-Gibbs method of electric lighting, of which an illustration may now be seen over a section of the Metropolitan Railway, London, is the latest development in the utilization of electricity as an illuminant. The chief characteristic of the new system consists in the use of secondary generators. The company are now illuminating the stations at Notting Hill Gate, Edgeware Road, Gower Street, King's Cross and Aldgate. For this purpose, the electricity is developed at Edgeware Road by an engine of 30 horse-power. The peculiarity of the system is, that the main current generated at the central station, when conducted along the wire to the subsidiary stations, is not, as is almost universally the case, transposed directly into light, but is passed through a secondary generator, in which the potential is varied as may be required for incandescent or arc lamps, or for the production of mechanical power. The primary circuit, which consists of a cable of four millimetres, or about one-sixth of an inch in diameter, is fifteen miles long, and is metallically closed with the generating dynamos. It is worth mentioning, as a notable fact in connection with this system, that whatever may be the electro-motive force traversing the circuit, the cable may be touched at any point throughout its whole length without danger. The chief difficulty hitherto experienced in the transmission of electric energy has been that of supplying a current which, whether utilized for lighting purposes or for driving machinery, should be of a potential variable according to the different requirements of consumers. Messrs. Gaulard & Gibbs' ingenious system for generating and applying the electric current has obviated that difficulty, and will enable consumers to manipulate electrical energy much in the same way as they do now gas and water, and to turn it into currents suitable for high or low-resistance lamps, for working machinery, for electro-chemical processes, and for various domestic appliances. Hitherto, great difficulty has been found in the lighting of incandescent lamps at any distance beyond 500 yards from the dynamo machine. Even a distance of 500 yards can only be accomplished by using conductors of large sectional area, as otherwise a very considerable part of the power of the engine would be used in heating the leads. The lighting of the stations referred to already between Notting Hill Gate and Aldgate (inclusive) is effected by a force of 30 horse-power, which is transformed by means of a Siemens alternating dynamo machine into a current of 2,000 volts and ten ampères. A remarkable feature in the transmission and distribution of electrical energy by this system is, that the loss in overcoming resistance remains constant in a line of given length, whatever the power transmitted may be. Thus, if required, an engine of 1000 horse-power might be substituted for the engine now in use, without any variance in the loss occasioned by overcoming the resistance of the conductor, provided the uniform value of the current remains fixed, as it would do. Taking the example of M. Gaulard, the loss of energy in transference on a circuit of 50 miles, formed by a cable of four millimetres (8 BWG) in diameter, would be  $102 \times 50 = 5,000$  ampères-volts, equivalent to about 500 kilogrammetres, or  $6\frac{1}{2}$  horse-power, no matter whether the force transported and distributed be one of 20 or 1,000 horse-power. Messrs. Gaulard & Gibbs believe that they have

invented and perfected the only system which affords facile means for at once converting natural forces into electrical energy, and conveying and distributing them over great distances at a practically unlimited number of points. In conducting their experiments for arriving at new and improved methods for the application of electricity to various industrial and scientific pursuits, Messrs. Gaulard & Gibbs had the courage and the wisdom to leave the beaten track marked out by Faraday, which electricians in recent years have trodden over and over again, and to go back to the comparatively neglected researches of Ampère. Faraday's experiments had been pursued in reference to the action of magnets or of magnetized iron on bobbins of insulated copper wire, while those of Ampère had as a basis the influence exerted by currents in movement upon bobbins of insulated copper wire. It is needless to point out that Messrs. Gaulard & Gibbs' system for the utilization of electricity has been built upon the lines indicated by the experiments of Ampère, and that there is, therefore, a radical and material difference between it and the other systems, which spring more or less from the results achieved by Faraday in his researches in the domain of electrical science.

As the secondary generator is destined to play henceforth a most important and indispensable part in the transmission and distribution of electrical energy in its various forms, the following brief description of it may prove interesting. A cable, consisting of a central wire, having a sectional area of four millimetres, with six smaller cables wound round it, is rolled in parallel spirals upon a hollow cylinder. Each of the smaller cables is formed of eight insulated copper wires, of one millimetre sectional area. Several of these cylinders are fixed on the same stand, and are so united as to allow of the alternating current of the thick central wire to generate, by the influence of its movements, a current of different potentials on the fine copper wires. Thus the main current, which is alternating, is made at the different stations or points where the light or power is required to traverse the primary conductor, that is the thick central wire, which by the reversals of polarity and the alternation of the primary currents, generate in the copper wires secondary currents of a potential, suited for any purpose to which they may be applied. By means of a small handle or regulator, the consumer can, at his will, limit the number of cylinders through which the electric current passes to one or more, thus determining, according to his requirements, the production of electric energy. Another handle regulates the introduction into the cylinders of soft iron bars, by means of which the current may be increased or diminished, and a perfect regulation of the light insured. The soft, steady light obtained from this new system, is due to the fact that the electric current traversing the fine copper wires of the secondary generator depends only on the quantity of the primary current, and is not influenced by its electro-motive force. It is characteristic of Messrs. Gaulard & Gibbs' secondary generators that they produce currents suitable to every kind of lamp, whereas in other systems each lamp requires a special current and a special dynamo machine. It is obvious that the employment of one principal wire of small dimensions for conveying the primary current throughout the whole circuit, however long, will effect a great saving. Indeed, it is evident that an important economy will be brought about in the leads alone

from the secondary generators to the lamps, which would always be close together—so important, indeed, that it would probably be represented by something like one-fifth of the outlay rendered necessary by the most economical of other existing systems, including the cost of the secondary generators. We speak of economy within the extreme limits possible by any other system; but, beyond a certain distance, there is no other system that can compete, under any conditions whatever, with Messrs. Gaulard & Gibbs'. Furthermore, it seems now demonstrated beyond a doubt that, except for small local isolated installations, electrical energy will in future only be employed, in the form of what Messrs. Gaulard and Gibbs have termed "secondary generators," that is to say, that the primary current from a dynamo machine will no longer be used for lighting lamps directly, but circulating on a metallic closed circuit, will be made the means of generating, at any number of points in that circuit, currents of any potential suitable for all domestic and mechanical purposes, and for various electro-chemical processes. The first application of the Gaulard-Gibbs system being for the production of light, it may be imagined that this is the direction of its development; but it must not be forgotten, that however important the distribution of light may be, that of power has a much wider and, indeed, almost indefinite field of development. The anticipations already shadowed forth as possible by scientific minds have now been brought within the sphere of practical application; and we have no difficulty in saying, that the important step taken by Messrs. Gaulard & Gibbs will mark an epoch of great importance in the history of electrical science. What is very unusual nowadays, we understand that the enterprise on which Messrs. Gaulard & Gibbs are embarked is one of a very exceptional character, seeing that no promoters, intermediaries, or financial agencies are mixed up with it. The system of secondary generators has been perfected by the unassisted labors and outlay of these two gentlemen, and we are informed that the capital of the company has been privately subscribed among friends.

The National Company for the Distribution of Electricity by Secondary Generators (Limited), have drawn up a project for the lighting of the Suez Canal throughout its whole course, and have presented it to M. de Lesseps, who appears to regard the project with much favor. It is not generally known in this country that ships, in passing through the canal, have to remain stationary during the night. If the canal were lighted, so that the shipping could pass through it at night as well as during the day, nearly half of the time at present occupied in getting from the Mediterranean to the Red Sea, and *vice versa*, would be saved. It is proposed to light the canal by means of 1,280 lamps placed on its banks, and on fixed beacons in the passage through the lakes. The primary current of 40,000 volts and 16 amperes required for supplying all these lamps would be generated by four dynamo machines of the capacity of 10,000 volts, and worked by a total horsepower of 850. The primary current would be transmitted on a cable 350 kilometres in length, formed by 18 wires (No. 19 B W G), the resistance of which would occasion a loss of about 10 horse-power. The total cost of the installation would be £81,750, and the expense of maintenance would be about £10,000 per annum. This would be a comparatively small outlay, which would benefit commerce, and doubtless pay the Suez Canal Company.

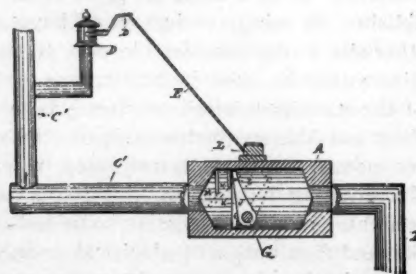
#### Device to Keep a Derailed Train on the Track.

AT No. 30 Pine street, this city, is to be seen a model of a device invented by A. A. Brooks, of Eau Claire, Wisconsin. Its object is to keep a train on the track after it has been derailed. The inventor, who has had many years' experience as a railroad man, is sanguine that his mode of preventing the serious results inevitable under existing arrangements, when the train leaves the rails, is both efficient and practicable. We think it well worthy the attention of companies who compete keenly for passenger traffic. Any one of these which could advertise that its trains are so provided that even derailment could not endanger the lives of its passengers, would have a very decided advantage in competition.

The Brooks device provides what is virtually a continuous guard rail, in a second set of wheels on the axles of locomotives and cars, of sufficiently smaller diameter than the running wheels to be out of the way when these are in their proper place on the rails, but wide enough to grip the rails and save the train from mischief in case it has left them. The working model shows that the device is capable of doing all that is claimed for it; and we are informed that a good number of railroad men who have examined it, speak of it in terms of approval.

#### Ellsworth's Alarm Indicator.

THIS device, invented and patented by Dewitt Ellsworth, Riverdale, Michigan, can be used with any inspirator or injector. It is fastened to the cold water pipe, and the water has to pass through the chamber of the alarm. There are valves so arranged in the chamber, that when the injector is at work, the water passes through freely. If the injector should refuse to work from any derangement whatever, there is a small whistle attached to the steam pipe of the injector, and a cord or wire running from the whistle lever to the shaft-arm, the steam takes the downward course, and the pressure against the valves causes the whistle to blow. Leakage or any cause whatever, will produce an alarm.



The above cut represents the alarm indicator. The chamber A, contains the stop M and valve K, to which is attached the shaft G with the lever F, which is attached by a cord or wire to the small whistle D. If from any cause the water ceases to flow, the steam forces the valve K open, which immediately blows the whistle, giving the alarm. It acts instantaneously.

WOOD, well saturated with oil, when put together, will not shrink in the driest weather. Boiled linseed oil is the best for general use. Crude petroleum on even old wheels is of great benefit.



**Hittinger's Car Fire Extinguisher.**

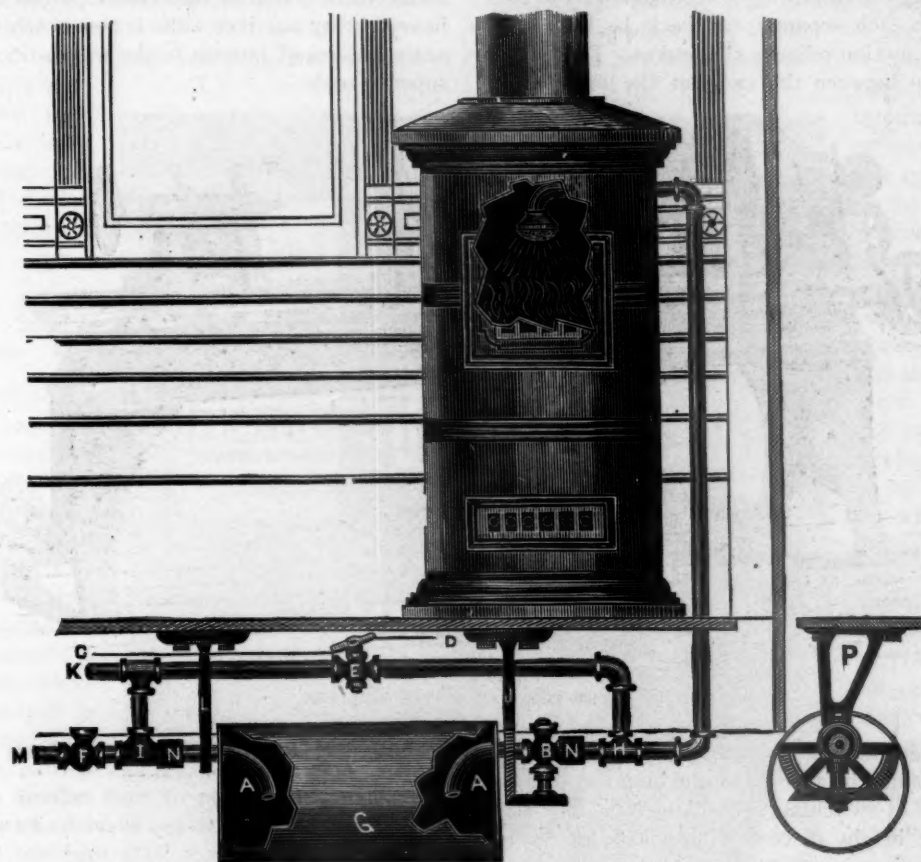
THE automatic device illustrated in the accompanying cut, is devised to extinguish fires in stoves, either in a collision or by the overturning of the coaches. It is the invention of C. Hittinger, Dayton, Ohio, patentee and proprietor.

The reservoir G, charged with salt water, is suspended from the bottom of the coach in hollow bearings, terminating in pipes near the bottom of the reservoir. These bearings are connected by packing points N, and both ends to fixed pipes, which arrangement admits of a free

**Steam Automatic Car Brake.**

THE patentees of the above named invention are Hugh McCalip and Marshall M. Nye, of Crawfordsville, Indiana. It is a simple attachment to the brake mechanism as it is now found on all freight cars, without making any change whatever, or interfering in any way with the hand brake.

The Steam Automatic Car Brake consists in attaching a steam cylinder immediately under the cab floor, bolted to the frame; or it may be attached under the forward end of the tender, in either case with suitable pipes to



HITTINGER'S CAR FIRE EXTINGUISHER.

movement of the reservoir. When the coach overturns, the swinging of the reservoir opens the stop-cock B, which permits the water to flow freely through the pipe and rise to the burning fuel in the stove; the force carrying the water being compressed air, derived through the pipe M connected to the air pump, which operates the brakes. When a collision occurs, the rod D, extending to the ends of the coach, opens the stop-cock E, and the water is discharged into the stove as previously described. The pipe K extends to the center of the coach, the ends terminating in a hose coupling, to which a suitable hose may be attached to convey the water to the remotest parts of the coach. A valve is situated at the same point as that of the coupling, which is opened by hand that the water may issue through the hose if the coach catch fire.

TRAMWAY cars in Milan, Italy, are lighted by electricity, and it is said that some of the tramway cars in London are to be lighted in the same way.

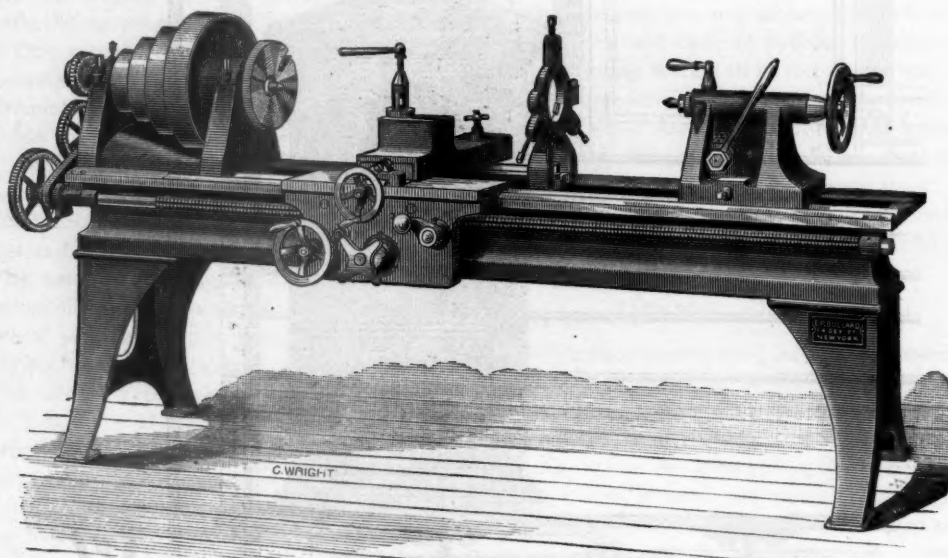
convey the steam to said cylinder. The piston-rod will be of such a length as to come on a line with the draw-bar head of the engine, on the end of which will be a buffer head. Under the tender and each succeeding car, held in suitable brackets, is a longitudinally sliding rod, so constructed as to be easily adjusted to the precise length of the car, including the draw-bars, and held in this position by coil springs. In the center of each rod is a projection or block facing upwards, fastened to said rod, upon either side of which rests the inner end of a lever which is pivoted to the car body, to which the brake mechanism is attached, and so arranged that either way the sliding rod passes from its center or resting place, the brake mechanism is put in operation and the brakes applied to the wheels.

In order to fully understand its operation, the reader must understand that the sliding rods are so arranged that when the train is fully made up of any number of cars, and the slack taken up till the draw-bar heads are

together, there is a continuous rod running through the entire train, the forward end of which is resting against the end of the pest rod proceeding from the steam cylinder. This being the case, in order to stop a train in motion it is only necessary to shut off the steam on the engine, when the momentum will immediately take up the slack. Then turn the steam into the cylinder, and the continuous rod is carried backward one foot, and the brakes on each car are simultaneously and instantaneously set. When the train is stopped it is only necessary to reverse the valve and shift the steam from the cylinder into the exhaust pipe; the coil spring immediately carries each rod attached to each separate car back to its resting place, and this motion relieves the brakes. There is no other connection between the cars but the link and pin,

The carriage is provided with an improved elevating rest by which an accurate adjustment of the tool is easily obtained, yet remains perfectly rigid under the heaviest cut. The feeds are positive yet entirely independent of the screw, which is in use only when required for screw cutting.

This Lathe is built by the Bridgeport Machine Tool Works, of Bridgeport, Connecticut, of which Mr. E. P. Bullard, of No. 14 Dey street, New York city, is proprietor. These Works have for the past three years made an exclusive specialty of a heavy sixteen-inch lathe, of which about three hundred have been put on the market. A heavy twenty-one-inch lathe is now nearly ready, and presents features of interest to the mechanic having use for superior tools.



LATHE FOR LOCOMOTIVE BUILDERS.

and the rod under each car is covered by the draw-bar head so that it cannot be affected by the bumping or jostling of the cars in switching or backing up. The discrepancy in the height of cars is provided for by so arranging the brackets in which the sliding rods are held, that the rods may be readily adjusted to a uniform height from the track. It is simple of construction and certain in its results, giving to the engineer complete control of his train.

According to the best estimates which have been made the improvement will not cost more than fifteen dollars per car.

#### Lathe for Locomotive Builders.

FOR plain turning and screw cutting on work under three inches in diameter, such as studs, bolts and rods, it is frequently found desirable to employ a lathe designed especially for that class of work. The lathe illustrated on this page is particularly adapted to meet the requirements of locomotive and engine builders, being heavy and well made.

The head is not back geared, but has a four grade cone, the largest section of which is fourteen inches in diameter and takes a three inch belt, thus providing ample power for any work up to the diameter named above.

#### The Hungerford Metallic Cross Tie.

THE Hungerford iron or steel railroad cross ties are claimed to be superior to any wooden ties now in use, because they make a firmer, safer road bed, being made of either iron or steel. Their being made of either of these metals renders it impossible for the track to spread or the rail to get out of place, as the connection of the rail to the ties is so complete they cannot get loose, or separate the one from the other, by any possible action of the wheels of the locomotive or cars. The road-bed never has to be disturbed by digging the earth and loosening the material that supports the track, as in case of the wooden ties, which become rotten every two or five years, and have to be taken out and replaced by new ones, rendering it necessary to disturb the bed of the road. This operation makes it uneven, and breaks the steady motion of the cars at all points where new ties are placed among old ones. While wooden ties are bedded in the ground, a ditch is formed for the water to settle in, and the action of the cars on the ties in the water is continually working the earth into mortar, which soon becomes too soft for safety and must be continually watched and filled under with material tamped in, to secure any sort of safety at a large expense. The iron ties, on the contrary, lay on the surface of the road-bed, and by lowering the earth a trifle



between the ties, the water is made to run off the track, and the material that supports the ties is always comparatively dry and permanent. Moreover, while spikes driven in wooden ties are continually getting loose and unsafe, the iron ties have no spikes or bolts to get loose and are always found in place. The construction of the iron tie is such that it obviates the necessity of fish plates and bolts at the ends of the rails. Iron or steel ties are much cheaper than wooden to handle and transport, as their weight and bulk are only one-third of wooden ones. The metal tie also obviates the necessity of punching any holes in the rails. Doing this weakens ties, and costs considerable money, better saved.

E. B. Hungerford, Corning, New York, the inventor of the metal tie, is prepared to make contracts to furnish iron or steel ties for one-half the cost of wooden ones, for a term of thirty years.

#### The Phillips Station Indicator.

WE give a cut of this new device, patented by I. N. Phillips, of Nashville, Tennessee.

It consists of a box containing a revolving drum made of light material, and having printed upon or attached to its face, the names of the several stations of the route, arranged in the order in which they occur. There is in front of the box a window, through which the names may be read as they are brought into position by the pawl and ratchet mechanism at the end of the box. Upon the shaft of the drum are secured two ratchet wheels, the teeth of which stand in opposite directions; and the pawl lever is provided with two pawls, one for each ratchet wheel. These pawls are attached to a common pivot and are operated by a single spring. Either pawl may easily be made to act on its own ratchet. The pawl lever is connected with a registering bolt which is moved whenever the indicator is operated, and projects between pins at the end of the drum, limiting the motion of the drum to one step. The pawl lever is connected by a cord with the handle by which the indicator is operated. The lever is also connected with a gong, so that whenever the indicator is operated attention will be attracted to it by the striking of the gong. A brake spring is applied to the top of the drum to prevent it from moving too freely. The direction of the rotation of the drum is changed by shifting the pawls at the end of the route. The names of the terminal stations are inscribed at the ends of the box.



THE PHILLIPS STATION INDICATOR.

#### Thayer's Car Coupler.

THIS, the invention of William S. Thayer, of Owego, New York, is one of the few among the almost innumerable car-couplings being produced, which is in the sure way to be fully tested. It was applied to the superintendent's car on the Delaware Division of the Erie, in November last, and new cars are now being built in the Port Jervis shops, on which it will be placed and given a thorough trial.

Its peculiarities are better indicated in the claim of the specification forming part of letters patent No. 286,745, than in any other way, without the use of illustrations. The claim is a rock shaft or crank lever formed from a

single rod, with its ends terminating in handles or cranks, and its central portion U-shaped, on the same plan as the vertical portion of said handles or cranks, and adapted to be connected to a car directly between the bumpers and the strengthening-piece or sill thereof; the bumpers of a car, having formed therein, at or near their centers, where they join the strengthening-piece or sill, a groove or corrugation, in combination with a rock shaft or crank lever having its central portion U-shaped, at its ends terminating in handles or cranks, the combination of bumpers each having formed therein a groove or corrugation, and provided with a metallic bushing, in combination with a

rock shaft or lever; and the stringer or strengthening-piece of a railway car, having its ends grooved or corrugated upon their inner sides, in combination with a rock shaft or crank lever having its central portion U-shaped.

#### Spike Puller.

KEYRAN J. DUGGAN, of Montgomery, Alabama, is the inventor of a new spike puller, the object of which is to provide a simple, practical, strong, and durable spike-pulling bar for use by railway track-men, lumbermen, and others requiring a tool of this class, which will not need frequent and expensive repairs.

The invention consists in a bar or lever fitted with a removable claw-head having an inclined tenon fitting in a flaring mortise of the bar, and locked in place by a tapering stud or key formed on the removable heel piece or block of the tool, whereby different claw-heads may be interchangeably and quickly fitted to the main bar, should

the claw head in use be accidentally broken, the construction thus also permitting the use with the one main lever or bar of claw-heads of varying size, shape and strength, as may be needed.

An advantage claimed for the tool above described and having removable and interchangeable claw-heads, over the common solid construction of the claw with the bar, is that broken claws may be replaced on the spot without loss of time, which is considerable when the bar is reheated and forged again to shape. The claw, and in the new tool the main bar and other parts are well calculated for durability in use, making the tool effective, and practical for its purposes.

Mr. Duggan has secured letters patent on his invention, concerning which he is prepared to furnish full particulars to those who write for them.

#### Knecht's Balanced Slide Valve.

IN this invention by J. C. Knecht, of Sigel, Illinois, the valve is rectangular in shape, and has an opening to permit the steam to exhaust freely. The valve at its ends is provided with glands, which are secured by screws, the glands being for the purpose of securing packing to the ends of the valve, which is clamped between them and the ends. A cover is open at the ends, and is secured to the valve seat in the chest over the valve, covering both the induction and exhaust ports. The cover on its under side is truly planed, so that the valve may slide accurately in it, the packing between the glands and valve preventing the passage of steam. The hood is somewhat shorter than the chest, so that the steam may enter freely at opposite ends, as the valve moves back and forth, in order to alternately reach the induction ports of the engine. The valve is operated by a rod, as usual, and being shorter than the cover, as it reciprocates alternately uncovers the induction ports and makes connection with the exhaust, so as to give motion to the engine.

W. L. BELLIS, 70 Michigan street, Cleveland, Ohio, is manufacturing a patented rim-plate for horse collars, which is of malleable iron, formed to fit on the rim of the collars where the hame ring rubs, and preventing the cutting out of the leather. It is fastened to the collar by screws or rivets of proper length. The use of the improvement is limited to cases in which the pole or wagon tongue is used. Mr. Bellis's claim is a perforated rim-plate for horse collars, having convexed outer surface and rounded edges, and curved longitudinally, whereby it is made to stand out from the face of the collar.

#### The Bridewell Motor Engine.

R. F. BRIDEWELL, No. 1606 Leavenworth street, San Francisco, is the inventor of an engine the mystery of which is not yet made public, and the use of which; he claims, will do away with all the expenses incurred by running the ordinary steam engine.

According to the statement of Mr. Bridewell, his engine will need no fire, no fireman and no engineer. It will obviate, therefore, the necessity of hauling away ashes, and of paying water bills. It will create no dirt, no dust, no smoke nor odor, require no governor or boiler, and no smoke stack. The power will be steady, and anyone will be able to handle this wonderful engine who can open and shut a valve. This valve will be marked like that of a steam

gauge, and will be set to run any number of revolutions below the maximum, which is to be fixed by the maker at about 360. The power, he promises, will be steady and uniform, without cost and without limit, and the cost of the engine to make will not be greater than that of the steam engine, when of equal power and style of workmanship in finish. Moreover, the inventor says that the wear will be less than that of the steam engine, there being no slides nor packing, the journals and boxes being all the wearing parts, and these as handy to fit and to replace as those belonging to the steam engine. In point of room the new motor will be something smaller than the steam engines, when the boiler of the latter is taken into account, with coal room, etc. Oil will be needed for lubrication, and oil only. The engine will be trustworthy and will not explode, and there will be nothing to take fire or to cause a fire from the machine in any way whatever.

This astonishing invention is the result of thirty-two years' study, from 1851 to 1883. It will be brought before the public some time about the beginning of 1884. We shall then see what we shall see.

COMMISSIONER FINK has in use at his offices, making up forms for averages, etc., a glutinous material which binds them into blocks of the thickness desired, in fifties, hundreds or other numbers, thus making pads, and avoiding the inconvenience of having sheets in a loose form, which are better used in the form of blocks or pads. The composition used is cheap, and applicable by an office boy. Particulars can be had from the Acme Composition Compay, No. 296 Pearl street, New York.

#### GOVERNMENT RAILWAYS OF NEW SOUTH WALES.

##### Contract for the Manufacture and Supply of 150,000 Tons of Steel Rails.

##### TO IRONMASTERS, MANUFACTURERS AND OTHERS.

The Government of New South Wales being desirous of encouraging the development of the local Iron Mining, and Iron and Steel Manufacturing Industries, are prepared to receive Tenders for the supply of 150,000 tons of Steel Rails, to be manufactured in the Colony.

Sealed Tenders marked outside "Tenders for the Manufacture and Supply of 150,000 tons of Steel Rails" will be received at the office of the Agent General of New South Wales, Westminster Chambers, Victoria street, London, S. W., not later than the 30th November, 1884, and at the Public Works Office, Sydney, not later than the 10th February, 1885, at which latter place the whole of the Tenders will be opened at 11 o'clock, A. M., on the day last named.

Each Tender must be accompanied by a Bank Deposit Receipt to the credit of the Commissioner for Railways in the sum of (£1,000) one thousand pounds sterling, as a guarantee of good faith. Such deposit will be returned to the unsuccessful Tenderers as soon as the Tenders have been declared, but the deposit of the successful Tenderer will be retained as security for the due performance of the Contract. Tenders not accompanied by such deposit will be absolutely rejected as informal.

Printed copies of preliminary Specifications and Conditions of Contract may be obtained on application at the office of the Commissioner for Railways, Sydney, and also from Messrs. R. W. Cameron & Co., of New York. Delivery of the rails is to commence not later than 1st December, 1886, and to be at the rate of not less than 15,000 tons per annum.

Contractors must give full information and particulars in their Tender as to the process of manufacture they intend to adopt, and also whether they will be prepared to manufacture and supply, at rates to be afterwards agreed upon, such points, crossings, fish-plates, and fastenings, &c., as may be required from time to time for the rails under this Contract.

Contractors must state in their Tender whether they intend to manufacture the rails from native materials only, or whether, and to what extent, they intend to use imported material, giving a separate price per ton in each case.

As it is unlikely that intending Contractors will enter into an engagement of the above nature, without first satisfying themselves by personal inspection as to the position and extent of the raw material in New South Wales required for the manufacture of iron, every facility and information on this subject will be afforded on application to the Under Secretary of the Mines Department, Sydney, or to Messrs. R. W. Cameron & Co., of New York, and free passes will be allowed on the Government Railways of New South Wales to representatives of Tenderers wishing to ascertain the resources of the Colony.

For the information of persons desiring to Tender, it may be stated that the official returns show that there were imported into New South Wales and Victoria (the two Colonies join each other, and are connected by Railway) within the last 10 years 1,250,000 tons of iron and steel inclusive of the permanent way material required for Government and other railways constructed during the period mentioned.

Department of Public Works,  
Railway Branch,  
Sydney, 1st October, 1883.

CHAS. A. GOODCHAP,  
Commissioner for Railways.



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**To Railway Men, Miners,**

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**CONDUCTORS, ENGINEERS,**

and others subject to the constant jar of the cars, who find themselves becoming nervous, with weakness of the kidneys, etc.; travelers and others exposed to sudden changes of temperature and climates, and who are liable to coughs, colds, lung complaints, rheumatism, malaria, and contagious diseases, will not only find our Magnetic Belt a CURATIVE but also preventive of these ills. They keep the blood pure, rich, and healthful, by giving it iron, magnetism and electricity—which are the life of it, as well as imparting tone and vigor to the nerves and strength and hardness to the muscles—thus keeping the system in its normal, healthful condition.

**READ THE EVIDENCE.**

CHICAGO, ILL., NOV. 7, 1883.

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Yours truly,

H. L. SEAVER,

Engineer Illinois Central R. R.

Residence, 1228 Indiana Ave.

CHICAGO, ILL., Jan. 24, 1883.

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Up to within four months ago, I have spent upwards of fifteen hundred dollars in trying to cure myself of rheumatism. I have made trips to the Hot Springs and different resorts throughout the country, all of which furnished me no relief. Four years ago I purchased a Belt, Lung Protector and Insoles from the Magneton Appliance Company, and have not had any rheumatism since wearing the appliances, which is the first time in five years I have been free from it.

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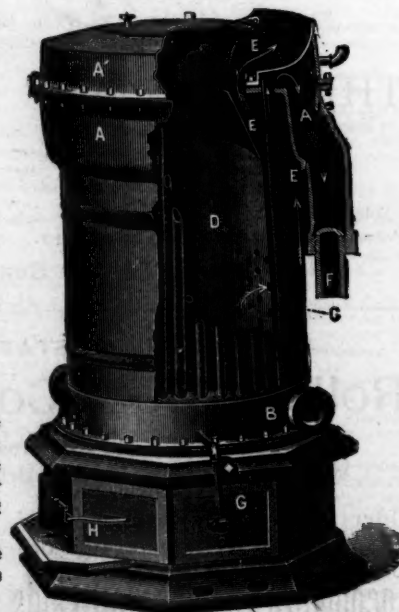
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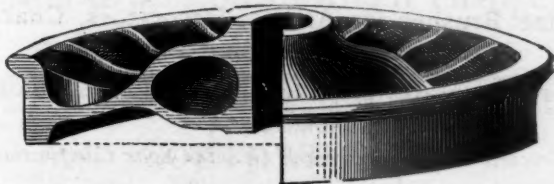
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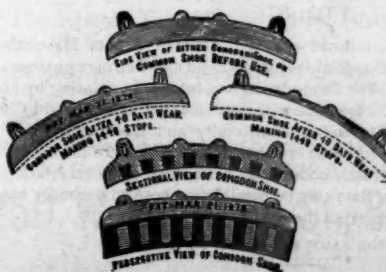
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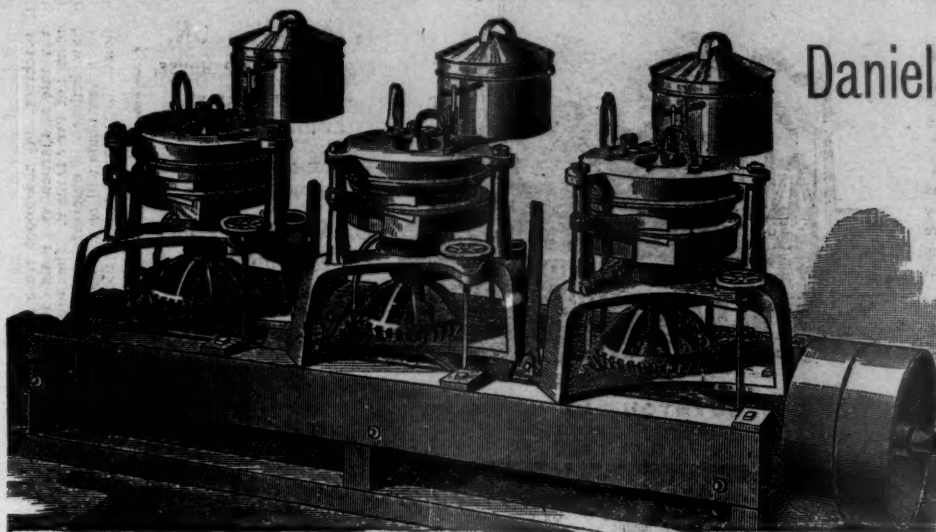
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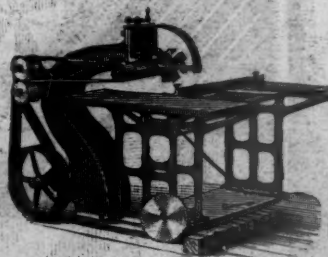
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